RAILROAD GAZETTE

FRIDAY, JUNE 7, 1901.

CONTENTS

Contributions

Concerning Exposition Rates.

May 10, 1901.

TO THE EDITOR OF THE RAILROAD GAZETTE.

I have read the editorial in the *Railroad Gazette* of May 3, on Exposition Rates. It seems to me to set forth, in an admirable way, the principles which should govern the making of rates on account of such extraordinary stimulants to travel as the Pan-American Exposition, *et id genus omne*. I think the editorial is in sympathy with the carefully-formed opinions of conservative railroad managers throughout the country, and it is a profound satisfaction to know that at least one railroad journal has the courage to express its convictions, albeit they are contrary to popular sentiment.

PRESIDENT.

The "De Glehn" Compounds on the Northern of France.

After the publication in the *Railroad Gazette* last fall of the details of the four cylinder compounds in France it may be of interest to the readers to see the records of some of their actual performances. This compound was introduced into France seven or eight years ago. The Nord was the first to go into the matter, and built an engine with a leading wheel and two pairs of drivers not coupled. Then very little later the standard class was evolved with a leading bogie and the drivers coupled. This has remained the standard, though it has been enlarged twice. In 1900 two engines of the Atlantic type were built—Nos. 2,641 and 2,642. No. 2,642 was in the Exposition and No. 2,641 was on the road making records everywhere for herself.

This system of compounding differs from any other in several ways:

1. The high and low pressure cylinders driving on separate crossheads and axles;

2. The use of a differential valve gear, allowing the driver to vary the lead of steam to each pair of cylinders independently and at will;

3. The power to turn live steam into all four cylinders at any moment or at any speed.

The first of these advantages lies in reducing the strain on the axle; the second, which allows the driver to vary the lead of steam in the cylinders at will, and the last and almost most important explain themselves. With a good driver using judgment, the last two, especially the second, contribute to very fine results.

On the Nord there are three great main lines over which the trains are worked at express speed—from Paris to Calais, Paris to Erquellines via St. Quentin, and Paris to Lille via Longueau. The idea in the United States and England is that the grades on these lines are nil and the country as flat as a pancake. Such is an entirely erroneous idea, and I will briefly give the chief grades from Paris to Calais, which are in all cases long and in some cases really very severe. From Pierrefitte to Survilliers, 13 miles, it rises 0.5 per cent., falling to Creil, thence level to Cleremont, rising 0.4 per cent. to beyond Gannes, 13 miles, and falling to Boves; level from Longueau to Etaples, with a rise of 0.57 per cent. for 8 miles out of the latter place and a corresponding fall to Pont de Brigues; from beyond Boulogne it rises to Caffiers with the last eight miles 0.8 per cent. and a fall to Calais. From this it will be seen that there are four summits, two of them steep and two long.

On the Erquellines line, which branches off by Creil, the line is level to Tergnier, but from there it rises for eight miles at first 0.3 per cent., becoming 0.4 per cent. near the top, falling into St. Quentin. Of the third line I am unable to speak from personal experience beyond Longueau.

The development of speed on this road has been gradual, but since 1898 rapid and sure. In 1898 England knew of no fast trains in Europe, or even of any good engines. However, my return in January of that year from the South made what was to me an eye-opener with 16 coaches, chiefly small four-wheeled ones weighing 200 long tons, and engine 2,158. We ran from Creil to Amiens, 50 miles, in 55 minutes, with a dead slow at Longueau, and even then the type of engine struck me as one of great merit. After this two and a half years passed till the Exposition year produced a new type or rather the adaptation of the "Atlantic" type. The three runs given in full were made between Oct. 8 and 15 of last autumn.

I am quite aware that the average Anglo-Saxon has no high idea of the worth of the Latin as an engine-driver or in any similar position, but I venture to state that I shall be very fortunate if I continue to come across such a nice set of men as those on the Nord, in all other countries where I may be. The courtesy which so distinguishes the Frenchman is not wanting and might well be copied by certain persons in this continent. On the Nord, when they give an engine pass they generally send an inspector to ride. I was fortunate. M. Rudloff, an ex-driver and now promoted to be traveling inspector, with his headquarters in Paris, was on all three trips my companion. To use an Americanism, he is "great." He is charming and knows how to get every ounce of work out of the engine. The driver, Barathon, too, is a fine specimen and would be hard to beat on any road in the world. He has one bad habit—that of lighting cigarettes with a burning piece of waste. It makes a nasty smell. He gets out of 2,641 every particle she is capable of and managed her splendidly. The fireman did very well and kept what I am sure would please some over here, a smokeless fire. That does not sound hard; but he had to fire with briquettes broken into pieces, and Pas de Calais coal, mixed, and the hose turned on the mixture till the dust was slush. That was fired into the fire-box in large lumps, the engine being worked hard—result, no smoke.

At Compiegne, 52½ miles, we had our first signal slack, but in spite of this took only 47 minutes 35 seconds for the 50 miles from Creil to Tergnier, which latter was passed at full speed. The grade was smartly ascended but At Compiegne, 52½ miles, we had our first signal slack, which reduced our speed materially, and in the yard at St. Quentin the signals were for the third time against us and a stop was hardly avoided. However, in spite of four slacks we took 97½ minutes for the 96¼ miles. The noticeable feature of this run was the smart way 2,641 climbed the grades, and the ease with which she ran on the level. It was a venture to make a trial on the 13th day of the month, but the three signal slacks seemed to take off the unluckiness of the day unless it is wrong to climb grades at such speeds, and certainly no self-respecting English engine would do so. I left her at St. Quentin and returned to Paris behind one of the 10-wheelers of the Nord. I would like to point out that the tons here mentioned are all those of 2,240 lbs. and not the short or American ton of 2,000 lbs. The weather conditions were favorable and the train was full.

Log of Boat Express Train, Northern of France, Paris to Calais—De Glehn Compound, Atlantic Type, Eight Cars, 235 Long Tons.

Miles.		Oct. 15, 1900. h. m. s.	
	Paris (dep.)	9:30:10	
4.3	St. Denis (pass.)	9:35:50	
31.8	Creil	10:02:15,	signal stop
		10:02:45	
36.2	Liancourt (pass.)	10:09:57	
41.1	Clermont (pass.)	10:14:27	
78.7	Longueau (pass.)	10:50:55,	dead slow signals
81.8	Amiens (pass.)	10:55:45,	dead slow
87.5	Ailly sur Somme (pass.)	11:03:45,	slow
110.	Abbeville (arr.)	11:26:12,	just outside station
	Abbeville (dep.)	11:39:20,	slow out 40 sec.
155.625	Pont de Briques (pass.)	12:26:06,	slow
183.1	Fontinettes (pass.)	12:54:20,	slack
184.3	Calais Ville (pass.)	12:56:10	
186.2	Calais Maritime (arr.)	12:58:40	

This run, made on Oct. 15, and without the favorable weather that prevailed on the two former ones. Rain out of Paris till Survilliers, and a strong side gale from the channel did not help us, but the load was light for the engine, after Saturday. This run was on the new English boat train, which allowed three and a half hours, with the water stop at Abbeville, for the 186½ miles. Not very fast, so that to make a good run special parts had to be run fast. We wished to run to Amiens in 81 minutes and then slower to Abbeville to kill time: fast on and up the Caffiers grade. We left sharp on time and passed St. Denis smartly, and up the first grade at a speed of hardly less than 60 miles an hour. We started the grade slower than usual owing to our fire for the first five miles not being burnt through and having only a pressure of 200 lbs. instead of 230. A smart descent before Creil

LOGS OF EXPRESS TRAIN NO. 179, NORTHERN OF FRANCE, DE GLEHN COMPOUND NO. 2,641, ATLANTIC TYPE.

Miles.		Oct. 8, 1900. h. m. s.	Oct. 13, 1900. h. m. s.
	Paris (departure)	1:51:40	1:52: 0
15.	Louvres (pass.)	2:09:15 up grade; 1 : 200, at 56 1-4 m. p. h.	2:10:25
25.6	Chantilly (pass.)	2:19:0, brake	2:20:30
31.8	Creil (pass.)	2:24:10	2:25:15, brake
52.5	Compiegne (pass.)	2:44:10	2:45:41 signal slack
88.1	Montescourt (pass.)	3:16:55	3:19:37 slack
96.2	St. Quentin (arrived)	3:26:20	3:20:25
		Load (official), 308 tons	Load (official), 365 tons 4 cwt.
		m. s.	m. s.
	Time booked	102 0	Time booked 102 0
	Time taken	94 40	Time taken 97 25
	Time slack	1 30	Time signals 2 30
	Time net	93 10	Time net 94 55
	Time gain	8 50	Time gain 7 5
	Speed miles per hour	61.194	Speed, miles per hour 60.78

First I will deal with the run on the 8th, my first on a French footplate. As there are no seats I stood just behind the driver where I could observe everything, take the times, and be out of the way. A German was in the fireman's place and Rudloff behind him taking the kilometers with his stop watch. As the line is down-hill for the first three miles we soon gained speed and averaged up the grade 13 miles long about 56 miles an hour. After the top we shut the regulator and drifted down to Creil, where we were slowed to about 25 miles an hour to cross over to the St. Quentin line: 32 miles all but 1 furlong in 32½ minutes and never exceeding 74 miles an hour down hill. After Creil we had the level road to Tergnier and did the 50 miles in 46 min. 40 sec. As we were much ahead of time Barathon had to ease her off after Tergnier to avoid arriving more than five minutes early at St. Quentin. However, up the grade to Montescourt we did 6¼ miles in $6^{1}/_{12}$ minutes. We ran the 96¼ miles in 94⅓ minutes with a 308-ton train and slow at Creil—the foot of the descent. This run was good and I went on to the frontier, 52½ miles, in 55 minutes and no hurry. On that trip I learned of the Saturday trip on the 13th. I found that this second trip was to be made as one of the course of trials which M. du Bousquet, the designer of the engine, was making and with 60 tons more train than ever before. M. Rous-Marten, the English authority, also timed the run from the carriage.

It was somewhat of a venture to load the engine up with 360 tons of train when only 102 minutes were allowed for 96¼ miles. In other words, it was equivalent to the "Empire State Express" schedule from Albany to Utica, 94.56 miles, in 102 minutes. But consider the difference in the weight of the train. We left two minutes late and at once got up speed, in fact, within three miles from the station, the speed had reached 60 miles per hour. While on the grade of 26.4 ft. per mile the slowest speed was 52 miles an hour, but at the last it rose to 54¼, which is, I think, not bad for a long grade of 13 miles. We never exceeded the legal maximum speed down the bank and steam was shut off two minutes before Creil, which was passed at about 30 miles an hour. On the level the speed soon reached 65 miles an hour. and then a signal against us. We were so far ahead of time that the Tergnier train was not clear and we stopped at the station 32 minutes 5 seconds from Paris; after a half minute stop we again started and up the long Gannes grade averaged 63 miles an hour, passing Breteuil, 59⅜ miles, in 62 minutes, from Paris, running down the grade from Gannes at no great speed. We were again slacked to a walking pace at Longueau, but saved the stop. Through Amiens the speed is about three miles an hour owing to there being turntables in the road. With the stop and the slow at Longueau for the 81¾ miles we took 85½ minutes. After St. Roch we soon gained speed till again a relaying slack occurred at Picguiguy, about 90 miles from Paris, reducing our speed to about 30 miles an hour. After this we had no more trouble till rounding the curve into Abbeville we saw the distant signal against us, and further on the 9:00 a. m. train standing in the station blocking our way. With one stop and three slows, two of them long, we took 116 minutes for the 110 miles. At this point we were eight minutes late, with only 80 minutes for the 76¼ miles and a slow at the foot of the bad grade out of Boulogne. I asked Rudloff if we could make the schedule and he said, "We shall arrive early." For the next 43 miles we had trouble from the gale, which blew a salt deposit on the rails, making them very greasy and so up to Hesdigneul 2,641 was constantly slipping and required careful nursing to get over the ground, besides as we neared the coast the wind increased. The slipping was especially bad on the bank out of Etaples and we had considerable trouble, losing a little time. How Barathon would have blessed the inventor of the device on the New York Central No. 2,980 to increase the traction. After Pont de Brigues came our relaying slacks to 20 miles an hour, together with the worst hill, ending with eight miles of 42 ft. to the mile. Barathon did on this hill some of the finest work I have ever seen done. Starting the grade at about 60 miles an hour we fell to 53 in the middle, but towards the top the speed rose to 56¼ miles an hour. Down the bank at good speed to Fontinettes, where there was another slow, and through Calais town to the pier 76¼ miles in 78 min. 40 sec., and 1⅓ min. early. This run was in some ways humorous. On the footplate

there was an English ex-driver from one of the big English lines full of his own idea of what was good. His views and mine on the performance did not agree.

This last run seemed one of great merit, but in November of last year, when the company was experimenting with the high-speed air-brake, 2,641 and a similar train ran from Paris to Amiens in 71 minutes, or 68 miles an hour, and on to Calais, 105 miles, in 96. I have no intermediate times, but this was sent me by M. Rudloff.

There would seem to be no doubt after reading these logs that there is a new type of compounding (new as regards this country) which is worthy of the most careful consideration by locomotive designers all over the world. Personally, I have never got any results approaching the log of the 13th, except with the new Central-Atlantic type on the New York Central. But her boiler is one-third bigger. I should much like to know if there are any records which will beat 230 tons, taken 81¾ miles in 71 minutes with two 13-miles grades to climb and go down, a maximum speed of 74½ miles an hour, which is never exceeded, and two slacks. The low maximum speed necessitates an engine capable of going uphill as fast as down. I wonder how the rival Atlantic City lines would like a rule of 75 miles an hour as the maximum speed; and this is not a paper rule but one to which the enginemen pay most scrupulous attention.

I would like to take this opportunity of thanking M. du Bousquet and M. Rodrique for the engine passes and M. Rudloff for his great kindness. R. Hope.

American Capital and British Shipping.

The diversion of American capital into investments connected with shipping and shipbuilding is of the greatest importance to our own maritime interests. There is no room for doubt that the Morgan-Leyland deal is only the first of a series of efforts towards the re-creation of an American mercantile marine. Writing in December last, we said that "There is undoubtedly a strong and growing popular sentiment in America in favor of taking the shortest possible way of gaining a foremost place among the maritime nations. If that way is to be by subsidies, then subsidies will be granted." And with regard to the building of ships we added: "Though the shipping interest is now very strong at Washington, it can hardly rest a claim for consideration on the score of cost of production. The wind is taken out of their sails on that tack by the immense shipments of shipbuilding material to Great Britain, and especially to Glasgow, which may be regarded as the center of the world's shipbuilding. There will, therefore, be more emphasis laid on the comparative costs of 'operating' vessels under the American and under the British and foreign flags."

The exports of shipbuilding material from the United States have ceased since we wrote these words. But the purchase of the Leyland Line by the Morgan syndicate is not only to further the interests of the steel trust in respect of their export trade, it is also calculated to accelerate legislation for the sibsidizing of all American vessels engaged in international traffic. The potentates of the steel trust would not have bought the Leyland steamers at 5 per cent. over their market value (and on a falling market, too), if there were not some deep underlying motive.

This [national subsidies] we believe to be the real ultimate purpose of the purchase of established lines of steamers by American capitalists. With such a large object in view, price is of small importance compared with the advantage to be gained by having, when Congress meets, great lines of American-owned steamers actually running under foreign flags. . . . Nothing would better serve the steel combine than to have such a rush of American capital into shipping as to make the coast ports resound with the noise of the riveter's hammer familiar to dwellers on the banks of the Clyde and Tyne. The rival capitalists, who are acquiring a controling interest in the Hamburg-American Line, also aim at subsidies and the provision of railway feeders. . . . Of course, the Hamburg-American steamers will remain under the German flag, just as the Leyland steamers remain under the British flag. But the coming Subsidies Bill will doubtless seek to provide for the immediate admission to the American register of all foreign-built steamers owned by Americans under foreign flags, and then our ship-owners will have to face a competition on the Atlantic and on the Pacific under seriously adverse conditions. . . . The price paid for the Leyland steamers is a great deal more than they could now be built for in Scotch or English yards, but probably not much more than they would cost just now in an American shipyard. For though iron and steel material can now be produced in the United States at a lower first cost than in this country, the protective tariff greatly enhances the cost of other material used in the construction and equipment of ocean-going vessels. But a natural consequence of the steel combine and of the railway and shipping development is a shipbuilding combine, in preparation for the good things to come. . . . The new shipbuilding company will have the advantage of possessing the only dry dock on the Atlantic coast of America capable of receiving vessels of the largest size. And the following significant statement accompanies the prospectus: "The company have received offers from the chief manufacturers in the United States to contract for a term of years for the regular supply of all steel required at prices not exceeding the market prices of such material in Europe. In such contracts there will be an the extent of the results which he has achieved may be agreement calling for immediate delivery of the steel, in this way enabling the company to carry on their work rapidly and efficiently, and avoid the costly delays now incident to shipbuilding in the United States."—*The Economist (London)*.

The Baltimore & Ohio Under Mr. Cowen.

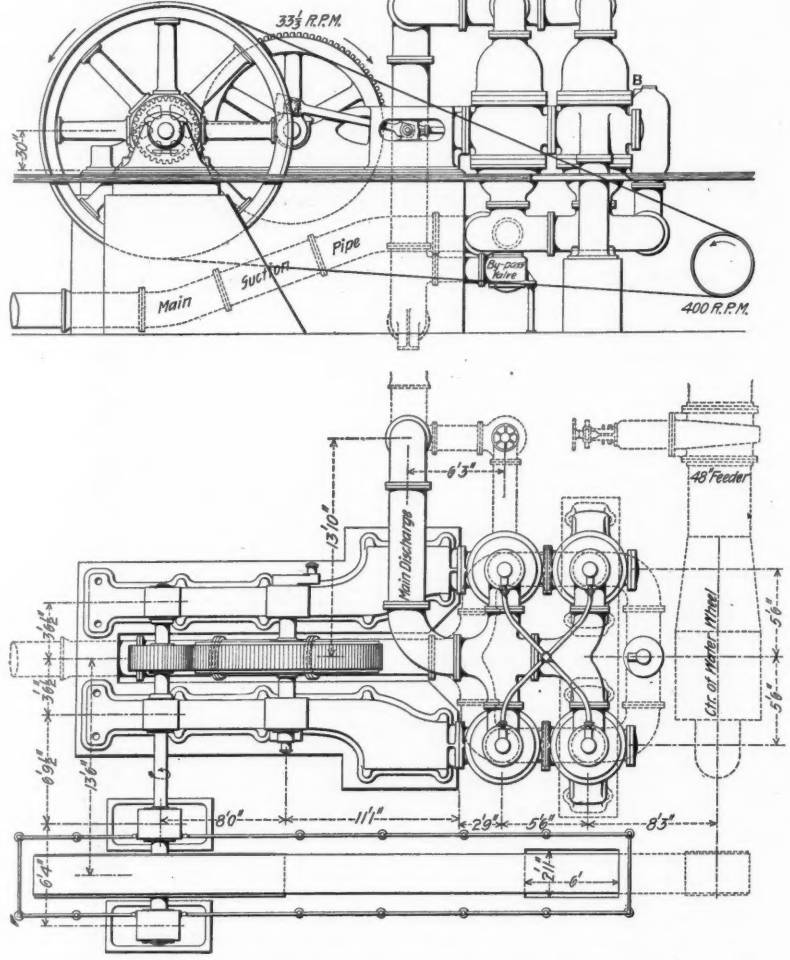
"Whatever may be the future of the Baltimore & Ohio Railroad, it is not likely that the demands upon its chief executive will ever again be as great as those which have been met during the last five years by Mr. Cowen. He accepted the presidency of the company on Jan. 24, 1896, and 36 days later the receivership which had long been inevitable commenced. His entire service as president and receiver covers little more than five years, yet the physical and financial rehabilitation of the property and its restoration to a place of prominence among the transportation lines of the east are the results of the energy and persistence with which he has sought its advancement, and the genius with which he has perceived and taken advantage of opportunities that were hidden to the eyes of most observers. An approximate idea of gained from the fact that the freight-ton mileage, which for the year ended June 30, 1895, was 2,470,822,808, or an average of 1,191,625 ton-miles per mile of line operated, had risen to 5,846,897,696, or 2,567,808 ton-miles per mile of road during the last fiscal year. The increase amounted to 137 per cent in absolute performance and 115 per cent. in density. During the same period the gross earnings increased 76 per cent., from $23,944,781 to $42,117,405, and the net earnings from $6,361,361 to $15,468,414, or 143 per cent. This was only accomplished through the expenditure of large sums in the improvement of the property and in the purchase of equipment, and the courage with which these expenditures were incurred, as well as the remarkable success with which the amounts necessary to meeet them were procured, are highly creditable to Mr. Cowen and indicate the confidence with which he inspired financiers. Early during Mr. Cowen's presidency the common stock of the company was quoted around 30, while it is now worth more than par. Such achievements in civil pursuits, though less spectacular, are characterized by the famous phrase of Conkling's, 'the arduous greatness of things accomplished,' even more truly than the conquests of war to which he alluded."—*Railway World*.

Mr. Cowen remains as General Counsel of the Baltimore & Ohio and Consulting Counsel of the Pennsylvania.

The Paris, Lyons & Mediterranean Railroad takes a leaf out of the New York Central's book, and June 3 began running an express carrying mail exclusively from Paris to Marseilles. One chief object is to relieve the night expresses of the heavy post-office cars. If the result is as satisfactory as is hoped for, this mail train will be run in the other direction also. It leaves Paris at 9:15 p. m.

New Pumping Plant of the Pennichuck Water Works, Nashua, N. H.

The Pennichuck Water Works, of Nashua, N. H., is a private company which supplies the city with water. The supply comes from a number of ponds, two of which are near the pumping station. At the outlet of each of the two ponds referred to there is a dam, and there has been for many years a water-driven pump just below each. Besides these pumps there are two auxiliary steam pumps for use when the supply of water for power purposes is insufficient. The company wished to increase the capacity of their water-driven pumping plant, and through the sagacity of the President, Mr. John F. Stark, of Nashua, the scheme was originated of, at the same time preventing the contamination of the spring water in the lower pond by water from the upper, and of rendering the water power twice as efficient as before, and so economizing the water to be used for power that the steam pump would be used for much less time during the year than heretofore.



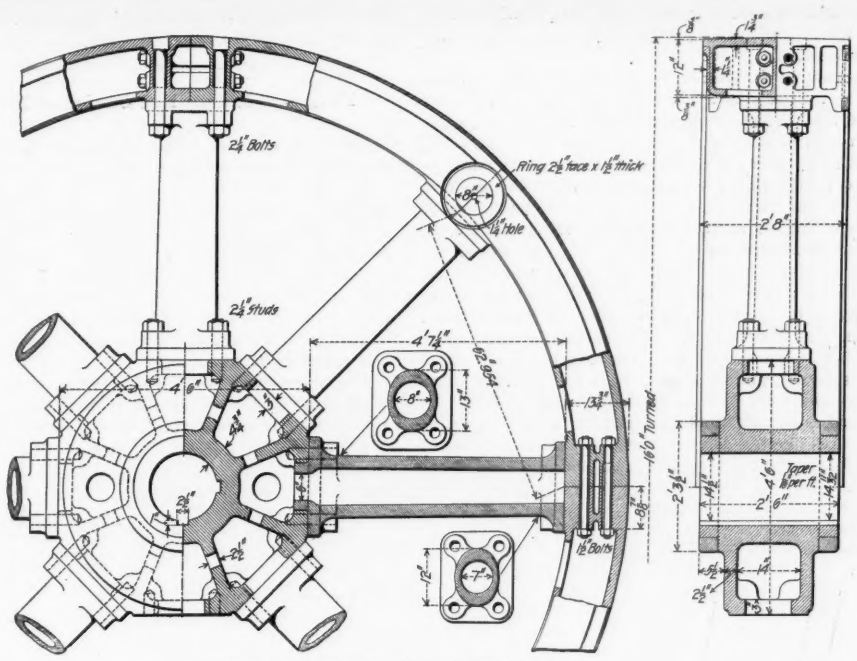
Six Million Gallon Pump—Pennichuck Water Works.

These objects were accomplished by combining the heads of the two ponds by means of a steel penstock running from the upper pond to a point just below the lower, and large enough to convey water for power and flood water in addition. Thus two heads of 30 ft. were combined into one of 60 ft., and the lower pond has become a reservoir for spring water.

The engineering for these changes was entrusted to Dean & Main, of Boston, who designed the head gate, penstock, pump, building, and the widened and deepened tail race.

The head gate, rack, and the pump were built by the Portland Company, of Portland, Me., the penstock by the Stewart Boiler Works, of Worcester, Mass., the water wheel by the Holyoke Machine Co., of Worcester, Mass., and the buildings by a local contractor. The work on the tail race was done by the company.

The diameter of the penstock, which is some 1,400 ft. long, is 6 ft. from the head gate to the branch for the water wheel, then tapers to 4 ft. at the waste gate, and is thence 4 ft. in diam. to the end of the waste discharge. The steel plates of which the penstock is made go entirely around, and all joints are single riveted lap. All holes were punched small and drilled to size in place, but as the contract was let at a time when prices were lowest the finished penstock was very cheap. It was painted with the Bitumastic Enamels Company's preparation.



Belt Fly Wheel—Pennichuck Water Works.

Rim, Gun Iron; Arms and Hub, Cast Iron.

The supply to the water wheel is controlled by a 48-in. gate close to the wheel case within the house, and the waste gate is of the same kind located in a small house nearby.

The water wheel is a single 21-in. horizontal bronze wheel making 400 r. p. m. It was of the usual commercial type and was necessarily located below the pumps. The cost of a special design of slow rotating wheel that might be direct connected to the pinion shaft precluded such an arrangement even if it had been otherwise desirable, and yet the commercial speed of 400 r. p. m. presented a problem in speed reduction between the wheel and pumps that was on first thought somewhat embarrassing. The capacity of the pumps was to be 6,000,000 gals. in 24 hours and it was determined to use a stroke of 3 ft. and 33⅓ r. p. m. To do this wholly with gears invited trouble and noise, and it was finally decided to reduce from 400 to 100 r. p. m. with a belt, and from 100 to 33⅓ with a pinion and gear. To drive a large pump by a belt was to the designers wholly novel, but it was argued that a belt is amply capable of driving anything provided it is wide enough and thick enough, and provided there is ample flywheel effect in the system. Here the matter of judgment entered as to the proper size of the belt. It was decided to use a 4-ft. pulley on the water wheel shaft and a 16-ft. pulley on the pinion shaft, thus making the belt speed 5,027 ft. per minute. A 30-in. triple leather belt was used and it has been perfectly successful from every point of view.

The pump is used for direct fire service as well as for pumping into the mains against the reservoir head. The fire head is about 80 lbs., and the regular head 55 lbs. The pump has been tested by pumping at a six million gallons rate against 120 lbs. This was done by pumping into the reservoir through an old 16-in. main about 6,000 ft. long. The regular main used is 24 ft. in diam. The pump horse power for 6,000,000 gals. is 154 for domestic service and 212 for fire service. The pump runs so quietly at all speeds and is so massive that it can safely operate at a higher rate of speed than 33⅓ r. p. m. continuously.

There are two pumps operated by cranks at right angles. On the crank shaft there is a 12-ft. mortise gear operated by an all-iron pinion 4 ft. in diam., the width of teeth being 21 in. The teeth are cut to run without back lash.

The pumps are built up of small pieces bolted together in order to have small breakages if any should occur. The novel construction was used of having the valve plates of steel castings entirely separate from the other pump castings. The idea of conical pistons so much used in marine engines was adopted for these plates. The pump valves are of rubber 3½ in. in diam. and the springs are of phosphor bronze bearing directly on the rubber. The velocity of the water is 2.35 ft. per second through the minimum waterway. The pump plungers are pointed and are finished clear to the points.

There is an air chamber on each end of each pump, all connected by a 3-in. pipe. They are charged by an air pump operated by a crank pin in the end of the pinion shaft.

The water is received by the pump under a head of a few feet through a main partly 20 in. and partly 30 in. in diam. Near the edge of the pond, in the suction system, there is a screen house provided with a gate for shutting off the suction. Connection is also made between the screen house and the penstock for supplying the pump with water from the upper pond in case it should be necessary to draw off the lower pond.

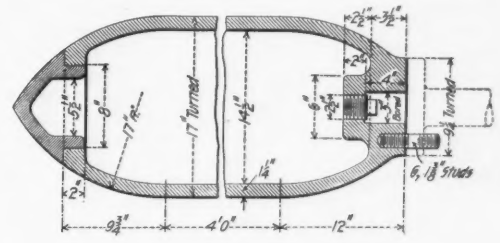
The suction is received in a complete circuit by both pumps, and there is an air chamber located on the middle of the loop back of the pumps. This is also connected with the air charging pump.

The pumps are supported on columns at their back ends and by connection to the bed plates at the crank ends, thus leaving an open space below.

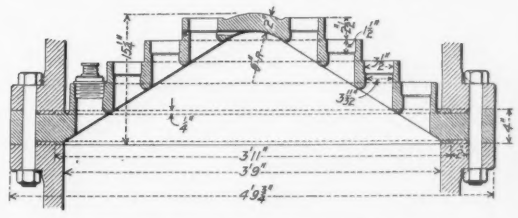
The bed plates are massive castings of box section resting on the foundations throughout their length. The guides are bored, and the pedestals have adjustable 4-part boxes.

The shafts, crank and crosshead pins, and plunger rods are of forged steel, and the crossheads and cranks are of steel castings. The mortise gear is cast in halves and held together by bolts and wrought iron rings shrunk on. The teeth are of young hickory and it will be observed that the rim of the wheel is made of box form so as to show only the working ends of the teeth, and thus avoid the scraggly appearance characteristic of such wheels in general.

The flywheel has a 32-in. face, and is 16 ft. in diam., the rim speed being, as before stated, 5,027 ft. per minute when running at the normal speed of 100 r. p. m. The company were anxious to have a specially safe wheel designed, and it was decided to build the wheel up of small pieces. The hub is a single casting forced on the shaft by a tapered fit and keyed on. After the keys were driven wrought iron rings were shrunk on as shown by the drawings. The arms are separate castings, as well as the rim segments, were faced off at both ends in a lathe, and were made to enter bored holes in the hub. At the hub they are held by studs screwed in unusually deep. At the rim end they are bolted by ream bolts passing entirely through the rim. The rim divisions are made at the ends of the arms, and the segments are of box girder



Cast Iron Plunger—Pennichuck Pump.

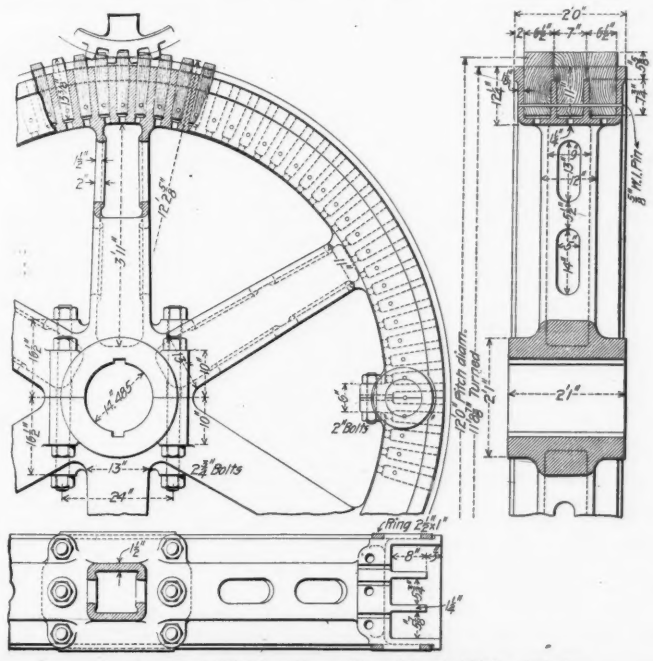


Cast Steel Valve Seat—Pennichuck Pump.

form. These segments are bolted together in the middle of the width by four free bolts and are secured to each other also by rings shrunk on projections on the sides.

The principle on which the wheel was designed is that it was to be safe if the fastenings between the rim segments should all get loose at the same time, thus throwing all of the strain from centrifugal force on the arms and their fastenings. It was also to be safe if the arm fastenings should get loose and the arms become merely distance pieces, the rim under such a condition standing the strain of the centrifugal force. The outboard pedestals have been made very heavy and are provided with 4-part boxes having side wedge adjustments.

The pump has been in operation since the first of October, 1900.



Twelve-Foot Mortise Gear—Pennichuck Water Works.

National Convention of Railroad Commissioners.

COMMITTEE REPORTS.

The thirteenth annual convention of Railroad Commissioners, including representatives from the several states having commissions, from the Interstate Commerce Commission, from the Association of Accounting Officers and from the Street Railroad Accounting Officers, was held in San Francisco this week, beginning on Tuesday.

Committee reports were presented on four subjects: (1) the basis of taxation, (2) legislation, (3) safety appliances, and (4) grade crossings.

On the first subject "What earnings of interstate railways constitute gross earnings within a state that can be justly assigned as taxable where the tax is upon gross earnings?" two reports were made; one by Mr. Graham L. Rice, of Wisconsin, and one by Mr. Chase S. Osborn, of Michigan. Mr. Rice said, in substance:

Wisconsin, Michigan, and Minnesota seem to be the only states where the railway tax is levied and collected in the form of licenses based upon the gross earnings. In Wisconsin the rate of taxation varies according to earning power. The license fee for railways earning $3,000 per mile or upward, is 4 per cent.; between $2,500 and $3,000 per mile, 3½ per cent; $2,000 to $2,500 per mile, 3 per cent.; $1,500 to $2,000 per mile, $5 per mile, and 2½ per cent. of the gross earnings.

We have in Wisconsin 52 separate railway organizations, and about as many different methods of accounting. I found when I came into my present position, Jan. 1, 1899, that some of the principal railways reported the gross earnings within the state upon the mileage basis. Wisconsin was credited with her mileage proportion of the entire line on the mileage basis; the Wisconsin miles were credited with the same earnings as were those in South Dakota and Nebraska, where, on some lines, there was but one train each way every day, while on some of the Wisconsin trunk lines there were fifty or more. Other railways having mileage in other states, as well as Wisconsin, reported the actual earnings in Wisconsin and the proportionate earnings of interstate traffic on the train mileage basis. Others again reported all the local earnings in Wisconsin and the interstate upon the road mileage basis. Some included rentals of tracks, yards and terminals, balance of car mileage, gross switching charges. Others excluded these items. Some of our companies own stock and bonds of newspapers, mines, quarries, and townsite and manufacturing companies; under our system of taxation, these

securities are not taxed as the income from them is not reported as earnings from operation. Some companies loan money on call, and receive quite an income from interest on deposits, advertising at depots, weighing machines, and a number of other little things that amount to quite a sum in the aggregate, all of which go into the income account, but not as earnings from operation.

It seems to me that where the tax is upon gross earnings all the revenue derived from the sale of transportation within the state, and all other revenue derived from the permanent capital of the company within the state, is justly taxable; that the sale of transportation revenue should be based upon the revenue train mileage basis, and the miscellaneous income should be included as gross earnings for the purposes of taxation.

Mr. Osborn called attention to the fact that even in states where the tax is based on the value of the property, a just estimate of the earnings is necessary because the value of railroad property depends on its earning power. The mileage-of-road basis is particularly inequitable because many branch roads are operated at a loss. Some roads have unimportant lines taxed according to earnings, in one state, while the more valuable lines are taxed in another state on their valuation. The law of Michigan purports to tax the property and business of a railroad, and the assessment is determined by considering the gross income for the preceding year. On interstate traffic the law requires the earnings in Michigan to be estimated by the distance such traffic is carried in Michigan as compared with the total distance it is carried. This plan is just and reasonable. It makes considerable work, as details of freight and passenger accounts have to be dealt with, but such work is time well spent and the plan does justice to all interests.

The Supreme Court of Michigan has lately decided a suit, of the commissioner against the Wabash road, upholding this feature of the Michigan law.

The report of the committee on legislation is signed by Messrs. Latta (Pa.); Prouty (I. C. C.); Baker (N. Y.); Ross (Vt.), and McNeill (N. C.). This report is mostly a review of the situation during the past year, with quotations from the address of Judge Knapp, at Denver, and from the last annual report of the Interstate Commerce Commission. The propositions and arguments heretofore presented are regarded as still sound and therefore there is nothing new to propose. The railroad problem has been fully discussed, on all sides, except in Congress; and it must be carried to that body; and the committee offers a resolution urging Congress to take prompt action; the Cullom bill is particularly recommended.

The report on safety appliances is signed by T. S. Hennessey (Mo.). It states that the committee has made a careful investigation of the conditions in the railroad world respecting safety appliances; and it is found that "a large percentage of the couplers in use have serious defects," so "that most of the devices in use are almost constantly out of order." Many, if not all, of the couplers "will not couple on curves." The Interstate Commerce Commission ought to serve notice on the railroads that after a given time, say six months, any attempt to couple two cars with the slotted knuckle is a violation of the statutes. The knuckle with slot and pinhole, with its danger to the employees, would then disappear. After a reasonable time the requirements should be made more strict, so that men could always uncouple without going between the cars. Moreover, the committee believes that the benevolent intent of the law will not be complied with until all cars have air-brake couplers which couple by impact. Also, the cutout cock in the air-brake pipe should be arranged so as to be opened and closed from the side of the car. Quoting a newspaper item telling of the injury of a switchman at East St. Louis, Nov. 24, the committee offers a resolution requesting the Interstate Commerce Commission to require the road in question, the Baltimore & Ohio Southwestern, to show cause why it was using cars in contravention of the law; also to show cause why it has not equipped all its cars with better couplers. And the Commission is asked to pursue a similar course with other railroads, where necessary.

The report on grade crossings is signed by Messrs. Cole (N. Y.); Laumeister (Cal.); Brown (N. C.); Foster (La.) and Bishop (Mass.). It reviews the laws and the present conditions in Massachusetts, Connecticut and New York. The New York law is only four years old, but in the city of Buffalo the crossing problem was taken up about nine years ago, by a special commission, and several millions of dollars have been expended there. This work is not a general scheme for raising the tracks of railroads, such as have been carried out in Chicago and other cities, but each crossing is dealt with by itself. The committee believes that extensive problems in cities are of a local nature and that state commissioners should consider more particularly the problem of rural crossings. Statistics show that the proportion of grade-crossing fatalities, based upon density of population within a certain radius of crossings, is less in the cities than in the rural communities. This showing is due to several governing conditions, among which may be mentioned these: 1. The alertness to danger of the urban population by reason of their daily or hourly travel across the danger points. 2. The fact that many of the crossings are protected by gates and flagmen. 3. That the trains moving across or along the streets of cities are ordinarily held under reasonable control by the engineers. The general interest and subject of improving grade crossings has more to do with suburban and rural improvement and safety than with the conditions existing in cities. It is on country road crossings that the most shocking and unlooked-for accidents occur, where frequently whole families or groups of pleasure seekers are killed or maimed.

The public is interested to prevent deaths and injuries, the railroads to avoid pecuniary loss; but behind these there is the consideration, of interest to both public and railroads, of safer and quicker operation. The Long Island road, by eliminating crossings and carefully watching those which cannot be done away with, has made it possible to run trains at high speed for 65 miles out of New York City so as to increase the value of land, at distant points, for suburban and summer residences.

In the rural districts of most states grade crossings are unnecessarily frequent, especially in hilly country, where crossings are much more dangerous than in level country. The highways have usually been made crooked in order to avoid expense (while the railroads are made more nearly straight), and thus we often see a highway crossing a railroad from four to ten times within a mile. In New York, Maassachusetts, Connecticut and Ohio crossings in cases like this have been cut out, at small expense, by building a short piece of highway on one side of the railroad.

Probably no railroad in the country could afford to abolish its grade crossings all at once. The expense at individual crossings is often enormous, even in small villages. There is a duty to abolish crossings so as to ameliorate the burden on the engineman, who, every day, is subject to a dreadful nervous tension by careless drivers who take risks in crossing the track only a short distance ahead of fast trains. Again, there is great danger to the train, as a wagonload of stone or logs, stalled on a crossing, may wreck a whole train. The report compares the experience of Massachusetts, where the state pays 25 per cent. of the cost of abolishing crossings; of Connecticut, where the state does not pay any share, unless the railroad commission applies for the change, and where the law requires one crossing to be abolished annually on each 60 miles of road; of Ohio, where the state pays nothing; and of New York, where the state pays 25 per cent., but only to a limited aggregate amount yearly. Since the New York law was established, work has been done or begun under it costing $1,500,000.

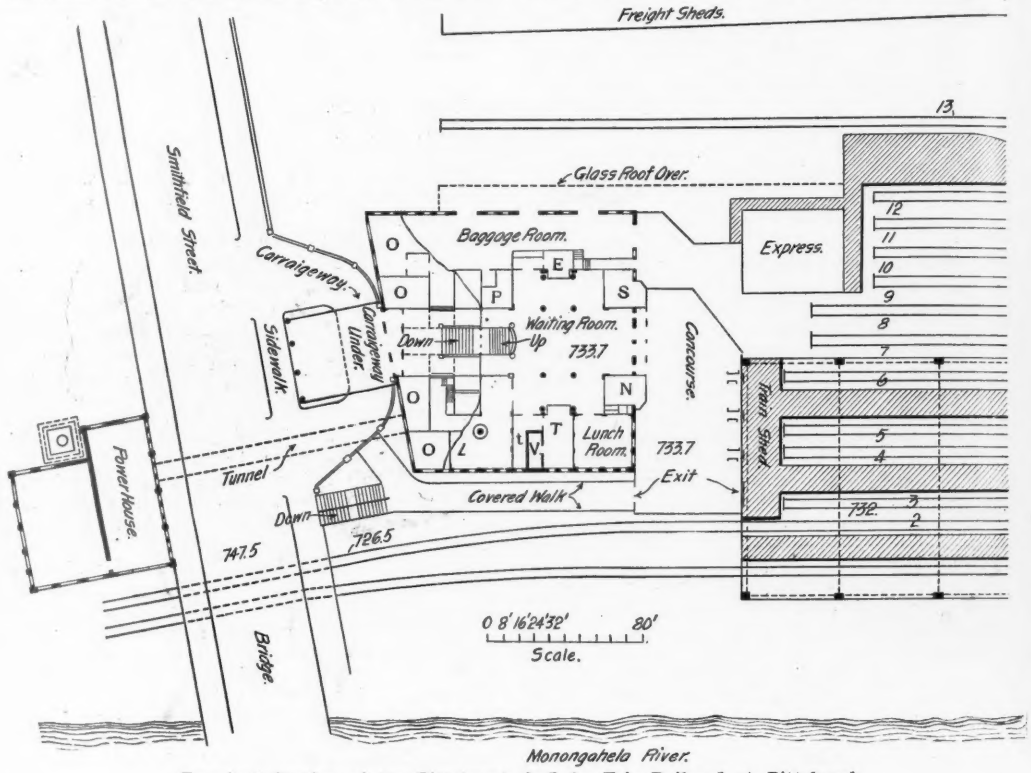
"The committee makes no effort to treat the subject exhaustively or to propound a general theory or method regarding the subject; for local considerations will undoubtedly govern the action of the various states, and the financial ability of both the railroad companies and the civic authorities will always have large influence in measuring the extent and character of this much needed form of public improvement."

The London railroad papers contain appreciative notices of Sir Courtenay Boyle, whose sudden death, on May 19, was noticed in the *Railroad Gazette* of May 24. *Herapath's* says that he is to be credited with being the chief official who, on the part of the Board of Trade, carried through the enormous task—extending through seven years—of readjusting the freight rates on the railroads throughout the Kingdom under the act of 1889, a work which demanded great diplomatic and legal ability and which was carried through with comparatively little friction. Parliament subsequently went back on its original agreement with the railroads, but that was no fault of Sir Courtenay Boyle. Incidentally, our contemporary remarks that opportunism has for a long time been the ruling political principle of the Board of Trade. Since becoming Permanent Secretary of the Board, Sir Courtenay has had to work in a diversified field and has shown that his ability is many-sided. He was a fine type of the best class of public servant. He always showed intelligent grasp of principles, courtesy, tact and patience.

Pittsburgh & Lake Erie Station at Pittsburgh.

The new station of the Pittsburgh & Lake Erie at Pittsburgh is one of the handsomest as well as one of the most complete passenger stations in the country. The company carries a large traffic, and the station, begun in 1899 and now finished, is a building worthy of the important situation which it occupies. It is an office building as well as a terminal station and it is seven stories high, though as it appears from the street it would be more accurate to call it six-story and basement.

The terminal tracks lie along the south side of the Monongahela River, about 14 ft. below the level of the southern approach of the Smithfield street bridge, adjoining which the station is situated. The entrance for pedestrians is at this street level through a high porch, the floor of which forms the roof of a porte cochere, which is approached by vehicles over a roadway leading down from the street to the lower or track-level floor. The upper entrance leads into a vestibule which opens into a foyer, from which steps descend to the main waiting room, which is also reached through a vestibule from the porte cochere. To the left of the waiting room is an excursion ticket office and to the right the regular ticket office. Opening from this waiting room is a parcels room, in charge of a woman, a telegraph office, a barber shop, a café, an information bureau, a news stand, a waiting room for women and a passage to the baggage checking room. In the waiting room are messengers and porters whose services are free to passengers.



Terminal Station of the Pittsburgh & Lake Erie Railroad at Pittsburgh.

References: O, offices; P, parcels; E, excursion ticket office; S, station master; N, newsroom; T, ticket office; t, ticket agent; V, vault; L, ladies' room. The figures in the floors (726.5; 732.0; 733.7, etc.) show elevations.

The driveways to the porte cochere is also an approach to an area at the south of the building, next to the outward baggage room. The transfer of baggage to the baggage cars is made through an area that is separate from the passenger concourse.

Passengers pass from the waiting room to the trains through doorways, opposite the main entrance, opening upon a covered area, the "concourse," which is enclosed by an iron fence broken by the three gates of the ticket examiners. The exit from the concourse to the street is along a covered passageway to the north of the station, leading to the porte cochere and up an easy flight of stairs to the Smithfield street bridge. The streams of outgoing and incoming passengers are thus kept in different channels. Except when there is a rush this exit passage can be used by passengers in the other direction who do not have to call at the ticket office. It is expected that an additional passage to the street will be provided by making a tunnel under the roadway with stairs on the farther side.

The train shed, 120 ft. wide, contains six tracks, two of which (at the north side) extend eastward along the river, forming the connection to the McKeesport division. The roof of the train shed is open at the sides and top to allow smoke to escape, and the girders are 50 ft. apart, producing a graceful appearance. The platforms are of artificial stone.

The head house, the four upper floors of which are occupied by the company's offices, is 120 ft. high. The architect is Mr. W. G. Burns. The exterior is imposing and the interior ornate. It is a magnificent building in early renaissance, of brown sandstone up to the third story with the upper stories of brick and terra cotta. The porch forming the main entrance is of ornamental iron, surrounded by a balustrade surmounted by ornamental iron lamps. In the center of the facade is a terra cotta model of a standard freight engine, typifying the principal

source of the company's revenue. The main vestibule is granite. In the center of the foyer is a court two stories high; then the foyer merges into a vaulted corridor which leads to the grand marble stairway leading to the waiting room. This vista extending from the vestibule is adorned with elaborate arches arising from Sienna marble piers, mosaic walls, with a Grecian border in colors, and a colonnade of 16 Ionic columns, likewise of Sienna marble.

The main waiting room is formed of a nave three and one-half stories high and of proportionate beauty. The doors and furniture are of San Domingo mahogany, the floor of French marble. Electric light comes from ornate fixtures that abound in the foyer, and in the waiting room there are a central chandelier of 18 lights, a row of lights 2 ft. apart on the cornice and 24 clusters of 5 lights each on the frieze. The waiting room is further adorned with art glass panels, and the windows are of colored glass crowned by a superb rose-colored window in the vaulted ceiling. The effect of this waiting room is gorgeous.

fective in preventing unwholesome odors in every part of the building.

Water is drawn from a driven well, by one pump at high pressure for service in case of fire, and by another pump at low pressure for other uses. The drinking water is distilled, filtered, cooled and propelled constantly through the building.

An automatic air compressor, in addition to other uses, charges trains with air while they are in the station. It also supplies compressed air to reservoirs where it is forced through hose used by the car cleaners, the cushions and upholstery of the passenger cars thereby being cleaned without the use of the dusting brush.

The offices of the upper stories of the building are of a plan and finish that comport with the elegance of the rooms provided for the accommodation of the passengers. There is a well equipped odorless kitchen and there are two dining rooms, one for the clerks in Louis XIV style and one for the officers in Old Dutch.

The land upon which this building stands is filled in

Pittsburgh & Lake Erie Depot—Pittsburgh.

Electric power, electric light, heat, ventilation and water are supplied by a powerhouse which is on the east side of Smithfield street and is connected with the station by a tunnel. Automatic stokers feed the furnaces, so that there is complete combustion and practically no black smoke. The heating of the building is by water which makes a continuous circuit from the propelling pumps throughout the station building and back to the pumps.

The well known character of the Pittsburgh atmosphere makes the preservation of cleanliness in connection with adequate ventilation a difficult matter, but it has been overcome in this building by a unique device. The windows of the waiting rooms and offices are air-tight and

on what was for 50 years one of the most important coal boat harbors of the Monongahela River.

Items in the London railroad papers indicate that Parliament has passed the bill allowing the construction of the "monorail" between Liverpool and Manchester. This is the project of Mr. Behr, which has been before Parliament for several months, and has once been turned away by the committee. The promoters propose to carry passengers at 120 miles an hour between the cities named, the locomotive and cars being supported on an A-shaped structure, the wheels being at the top and the seats below on the sides. *Herapath's Journal* says that the railroad

P. & L. E. Train Shed—Pittsburgh.

fixed, the only opening being through one sash in each window for cleaning. Air is drawn from the top of the building through a shaft to the basement, where it is washed, dried, heated in winter, or cooled in summer, and then blown through the building in volume sufficient to completely change the air in each room every 15 minutes. Suction pumps in the attic withdraw the foul air into the outer atmosphere. This system is especially ef-

world, excepting, of course, the Cheshire Lines, whose passenger traffic will be seriously affected, will view the action of Parliament with satisfaction, as it promises to afford an interesting experiment at other people's expense. And as long as people are ready to put millions into gold mines on the remote possibility of getting back a small part of their money, it is safe to say that the monorail can raise what capital it needs.

Train Accidents in the United States in April.

COLLISIONS.

Rear.

6th, on Michigan Central, at Wayne Junction, Mich., a passenger train standing at the station was run into at the rear by a following freight train, badly damaging one sleeping car and the freight locomotive. Two passengers and one trainman were injured.

6th, on Chicago, Rock Island & Pacific, near Perth, Kan., a freight train descending a grade broke in two and the rear portion afterward ran into the forward one, damaging two cars. Two brakemen were injured.

10th, 2 a. m., on Louisville & Nashville, near Jones, Tenn., a freight train broke in two and the rear portion afterward ran into the forward one, damaging several cars. A tramp was killed.

17th, on Southern Railway, near Danville, Va., a local freight train which had been unexpectedly stopped, had sent out a flagman and had called him in, was run into at the rear by a following mixed train of the Danville & Western, doing considerable damage. The fireman was fatally injured and one passenger and one other trainman were hurt.

27th, 8 p. m., on Wabash road, at Lafayette, Ind., a passenger train ran into the rear of a preceding freight, badly damaging the engine and several cars. A man riding in a car in charge of a horse was killed and two trainmen were injured.

30th, on Southern Pacific, near Emigrant Gap, Cal., a special passenger train ran into the rear of a preceding passenger train in a snow shed, damaging the engine and several cars. The fireman was killed and several passengers and trainmen were injured. The foremost train had been stopped by a rock which was lying on the track in the snow shed.

And 11 others on 11 roads, involving 2 passenger and 16 freight and other trains.

Butting.

2nd, on New York, Chicago & St. Louis, near Erie, Pa., butting collision of freight trains, damaging both engines. One engineman was fatally injured. It is said that the collision was due to a misunderstanding of orders.

5th, 5 a. m., on New York Central & Hudson River, near Hannibal, N. Y., butting collision between a freight train and an empty engine; four trainmen injured.

10th, on Southern Pacific, near San Atonio, Texas, butting collision of freight trains; one fireman fatally injured.

10th, on Lake Erie & Western, at Boswell, Ind., butting collision of passenger trains, due to a misplaced switch; three passengers and two trainmen injured.

12th, on Louisville & Nashville, at West Pineville, Ky., butting collision between a freight train and a work train, both running at full speed. Both engines were wrecked. One engineman and one conductor were killed and one other trainman was injured. It is said that an operator delivered an order which had been superseded.

12th, 7 p. m., on Chicago, Burlington & Quincy, near Creston, Iowa, butting collision of freight trains, both of which were running at high speed, wrecking both engines and several cars.

15th, 4 a. m., on Union Pacific, near Otto, Wyo., butting collision between a freight train and an empty engine, damaging three locomotives, two of which fell into a ditch. A blinding snowstorm prevailed at the time.

16th, on Illinois Central, near Woodbine, Iowa, butting collision of passenger trains, both running at good speed. Both engines and several cars were damaged. The engineman of the westbound train was killed and four trainmen were injured. The westbound train wrongfully encroached on the time of the eastbound.

18th, on Wheeling & Lake Erie, at Cleveland, Ohio, butting collision between a freight and a work train, wrecking both engines and several cars. A brakeman was killed and three other trainmen were injured, two of them fatally.

19th, on Baltimore & Ohio, at Cook's Mills, Pa., butting collision of freight trains, damaging 18 cars. A man stealing a ride was killed.

19th, on Southern Pacific, near Caliente, Cal., butting collision between a freight train and a work train; one trainman injured. Misunderstanding of orders is given as the cause.

20th, on Philadelphia & Reading, at Tyrol, Pa., butting collision between a westbound passenger and an eastbound freight train, badly damaging both engines and several cars. The passenger engineman was killed and the fireman and one passenger were injured. There was a dense fog at the time.

20th, on New York, New Haven & Hartford, near Providence, R. I., butting collision of passenger trains, damaging both engines. One passenger and one fireman were injured.

22nd, on Central of New Jersey, at Bayway, N. J., butting collision of passenger trains, due to a misplaced switch, damaging both engines and several cars. Four passengers were injured. It is said that the switch had been properly set, but that a station man by an unaccountable mistake misplaced it in the face of the approaching train.

And 4 others on 3 roads, involving 2 passenger and 6 freight and other trains.

Crossing and Miscellaneous.

4th, on Central of New Jersey, near Elizabeth, N. J., a passenger train ran into a freight which was switching on the main track, damaging both engines, one of which was overturned. The passenger fireman was killed and five passengers were injured.

4th, on Pennsylvania road, at West Philadelphia, Pa., collision of switching freight trains; two trainmen injured.

6th, 4 a. m., on New York Central & Hudson River, at 59th street and Park avenue, New York City, collision of freight cars in switching, due apparently to the cars having been left unattended on a grade. One car and the tender were damaged, and a brake inspector was killed.

7th, on Chicago & Eastern Illinois, near Danville, Ill., a freight train ascending a grade broke in two and several cars ran back some distance. A switching engine was attached to these cars and they were being pushed forward when they collided with the front portion of the train, which was returning, wrecking four cars of oil.

9th, on New York Central & Hudson River, at Troy, N. Y., collision between a passenger train and a locomotive, due to a misplaced switch; one trainman injured.

10th, on Pennsylvania road, at Olean, N. Y., a freight train collided with a tank car containing benzine; the benzine took fire and seven loaded cars were burned up.

12th, 1 a. m., on Baltimore & Ohio, near Auburn, Ind., collision between a passenger train and a work

train, damaging several cars. One passenger and one engineman were injured.

13th, on Gulf, Colorado & Santa Fe, near Cleburne, Texas, collision of freight trains, derailing many cars; three trainmen injured.

16th, night, on Southern Railway, near Tuscumbia, Ala., a passenger train ran into some cars, loaded with iron pipe, which had been left standing on the main track, and the engine was badly damaged. Three trainmen were injured.

20th, 10 p. m., on Southern Pacific, at Beaumont, Texas, collision between a freight train and a switching engine, one of the trains having no headlight. The engineman of the switching train was killed.

21st, on New York Central & Hudson River, at Buffalo, N. Y., collision between a passenger train and an empty engine, doing slight damage. The empty engine, having been desterd, started off eastward unattended, and ran several miles on the main track. The tender, after running about one mile, was derailed and badly damaged, but the engine continued until its power gave out.

23rd, on New York, New Haven & Hartford, at Readville, Mass., a westbound passenger train ran over a misplaced switch and into an empty passenger train standing on a sidetrack; fireman injured.

24th, 2 a. m., at Cambridge, Ohio, a freight train of the Cincinnati & Muskingum Valley broke in two and the rear portion ran back to the crossing of the Baltimore & Ohio, there colliding with a freight train and damaging several cars and the station building. One employee was killed and two were injured.

24th, on Norfolk & Western, near Shenandoah, Va., collision of freight trains; one engineman injured.

26th, 11 p. m., on Cincinnati, New Orleans & Texas Pacific, at Burgin, Ky., the two engines of a freight train, having been detached from the cars, were standing at a water tank, when the cars of the train, having eluded control on a descending grade, where they had been stopped, ran into the engine, and the engineman and fireman were killed. The tender and one freight car were wrecked.

30th, on San Antonio & Aransas Pass, at Nora, Texas, a passenger train ran over a misplaced switch and collided with a freight train. One engineman and several passengers were injured.

30th, on Norfolk & Western, near Norfolk, Va., passenger train No. 3 collided with a switching engine, wrecking three freight cars. The wreck was partly destroyed by fire. One trainman was injured.

And 20 others on 16 roads, involving 8 passenger and 33 freight and other trains.

DERAILMENTS.

Defects of Roadway.

4th, on Durham & Charlotte, near Gulf, N. C., a mixed train broke through a trestle bridge and the engine and several cars fell into Tysor's Creek. The engineman and two brakemen were killed and another man was injured. The bridge appeared to have been weakened by a flood.

8th, on Plant System, near Thomasville, Ga., a freight train broke through a bridge which had been weakened by fire, and 11 cars were wrecked. The engineman was injured.

14th, 11 a. m., on Southern Pacific, near Icarus, Nev., a fast fruit train drawn by two engines was derailed by a broken rail and four cars were ditched. The fireman was injured.

19th, on Southern Pacific, at Piru, Cal., a passenger train was derailed, apparently by a broken rail, and the passenger cars were all overturned. One passenger was injured.

20th, on South Carolina & Georgia Extension road, near Blacksburg, S. C., the engine of a passenger train broke through a trestle bridge which had been weakened by a flood and fell into the flood 50 ft. below. The engineman was killed, but the fireman lodged on a pile of timbers and escaped. The roadmaster suspected the stability of the bridge and the engine had been detached from its train and was run upon the bridge to test it.

And 9 others on 9 roads, involving 3 passenger and 6 freight and other trains.

Defects of Equipment.

7th, 9 p. m., on Southern Pacific, near Wells, Nev., a passenger train was derailed, while running at high speed, by a broken wheel, and the two engines drawing the train, together with the baggage and mail cars, fell into the ditch. Three sleeping cars were also derailed and took fire from a stove and were burned up. The mail cars were also destroyed by fire, with 700 bags of mail. Two firemen were killed and one engineman was injured.

8th, on Yazoo & Mississippi Valley, near Whittaker, Miss., a freight train was derailed by the breaking of a heated journal, and a tramp was injured.

10th, 11 p. m., on Erie road, near Belvidere, N. Y., a freight train was derailed by a drawbar which was pulled out and fell on the track, and 10 cars were wrecked. A tramp was injured. The derailed cars did considerable damage to an iron bridge.

18th, 3 a. m., on Lake Erie & Western, at Cassville, Ind., the foremost of two locomotives drawing a freight train was wrecked by the explosion of its boiler, and the second engine and 15 cars were derailed and badly damaged. Six trainmen were injured.

18th, on St. Louis Southwestern, near Kerens, Tex., a freight train was derailed by a broken wheel and 10 loaded cars were wrecked. One man was injured.

29th, on Chicago Great Western, near Hudson, Iowa, a freight train was derailed by the breaking of a flange, and 10 cars, a signal tower and a small bridge were wrecked.

And 21 others on 17 roads, involving 21 freight trains.

Negligence in Operating.

1st, 7 p. m., at Suspension Bridge, N. Y., a car in a passenger train of the Lehigh Valley was derailed, apparently by the premature throwing of a switch; the conductor was injured.

3rd, on Atlantic Coast Line, at Manchester, Va., a passenger train was derailed by a misplaced switch; engineman injured.

5th, on West Virginia Central & Pittsburgh, near Thomas, W. Va., the caboose and one car of a freight train broke away on an ascending grade and ran back. The men in charge of the remaining portion of the train started back to catch the runaway, but soon eight more cars broke away and ran uncontrolled some distance to a curve, where they jumped the track and fell down a bank. The car which first ran away was also derailed some distance farther down. One trainman was killed in the derailment of the eight cars.

10th, 1 a. m., on Southern Pacific, near Bradley, Cal., express train No. 9 was derailed while running at high speed on a very sharp curve and the first seven of the 10 cars were ditched. One of the cars took fire, no doubt from the heater, and the whole train, except the engine and the three rear cars, was destroyed by fire, including a large quantity of baggage, mail and express matter. It is said that no employees or passengers were seriously injured.

12th, on Missouri, Kansas & Texas, near Denison, Texas, a southbound passenger train was derailed at a derailing switch approaching the junction of the St. Louis & San Francisco and the bridge over the Red River, and the engine fell down a bank.

23rd, on Philadelphia & Reading, at Lester, Pa., a freight train ran over a misplaced switch and into some cars standing on a side-track. These cars were wrecked and pushed against a building, breaking down its brick wall. Four men at work on the cars were injured.

30th, on Erie road, near Cherry Creek, N. Y., a passenger train was derailed at a point where track repairs were in progress and several cars were ditched, the mail car being overturned and the express car wrecked. Several passengers and trainmen were injured.

And 8 others on 8 roads, involving 2 passenger and 6 freight and other trains.

Unforeseen Obstructions.

2nd, on Norfolk & Western, near Swords Creek, Va., a freight train drawn by two engines was derailed by a landslide and one engineman and one fireman were killed.

4th, on Galveston, Harrisburg & San Antonio, near Uvalde, Tex., a freight train drawn by two engines was derailed by running into a push car loaded with steel rails, and the engines and five cars were ditched. One engineman was injured.

4th, 9 p. m., on Wheeling & Lake Erie, near Jewett, Ohio, a freight train was derailed by running into a rock which had fallen on the track, making a bad wreck. The engineman and a man riding in a car in charge of a horse were killed, and two trainmen were injured.

7th, on Cincinnati, New Orleans & Texas Pacific, near Spring City, Tenn., a freight train drawn by two engines was derailed by running over a cow, and both engines were ditched. Both of the engines were overturned and their boilers exploded. One fireman was fatally scalded and three other trainmen were injured.

8th, evening, on Pennsylvania Lines, near Coshocton, Ohio, a work train, moving backward, was derailed by a landslide, and the caboose fell into a river. The conductor and three other employees were injured.

14th, on West Virginia Central & Pittsburgh, at Chaffee, a freight train was derailed by a rock which had fallen on the track, and 10 cars were wercked. One brakeman was fatally injured.

15th, on Ohio River road, at Point Pleasant, W. Va., a freight train was derailed by running over a cow, and the engine was overturned. The engineman was killed and three other trainmen were injured. The wreck took fire and was partly burned up.

16th, 8 p. m., on Burlington & Missouri River, near Gibson, Neb., a passenger train was derailed by a landslide. The fireman, one other trainman and two passengers were injured.

18th, 2 a. m., on Southern Railway, near Jackson, Ala., a freight train was derailed by sand which had been washed upon the track by a flood. The engineman was killed and the fireman injured.

18th, on Colorado & Northwestern, near Boulder, Colo., two locomotives coupled together, which had been detached from a passenger train and been run forward some distance to clear the line of snow, were overwhelmed by a snowslide and pushed down a bank. Both enginemen, one fireman and the conductor were killed.

23rd, 11 p. m., on International & Great Northern, at Davenport, Texas, a southbound passenger train was derailed at a switch, said to have been purposely misplaced, and all of the cars were ditched except one sleeper. The engine was overturned. The fireman was killed and five other trainmen were injured.

30th, on Philadelphia & Reading, near Sheridan, Pa., a freight train was derailed at a maliciously misplaced switch and was overturned. The engineman was injured.

30th, on Bangor & Aroostook, near Brownville, Me., a mixed train was derailed by running over a cow, and the engine was ditched. The engineman and fireman were injured.

And 11 others on 10 roads, involving 2 passenger and 9 freight and other trains.

Unexplained.

2nd, on Seaboard Air Line, near Dent's, S. C., a freight train was derailed and the conductor was injured.

2nd, 8 p. m., on Louisville & Nashville, near Stephens, Tenn., a freight train was derailed and nine cars were wrecked. A brakeman was killed.

4th, 8 a. m., on New York, New Haven & Hartford, Providence Division, near the South Terminal Station, Boston, a car in a train of empty passenger cars was derailed and ran to one side sufficiently to block the inbound track; it also disarranged some of the air-pipes and electric wires controlling the signals so that a number of switches and signals had to be moved by hand. The delays caused by the blocking of three tracks and the disabling of the switches and signals hindered all of the trains between the Terminal and Back Bay Station for about four hours.

5th, 2 a. m., on Vicksburg, Shreveport & Pacific, near Ruston, La., a freight train was derailed and eight cars were wrecked. A tramp was killed and two others were injured.

6th, on Southern Pacific, near Santa Barbara, Cal., a freight train, while running at full speed was derailed and several cars were ditched. The engine was at once started for the next station in order to get assistance, but after it had gone about two miles the tender was derailed and ditched, pulling the engine also off the track. The fireman jumped off and was injured.

7th, on Wabash road, near Bloomfield, Iowa, a freight train was derailed and four passengers were injured.

10th, on Cleveland Terminal & Valley, near North Industy, Ohio, a caboose being hauled by a locomotive and running at good speed, was derailed at a curve and fell down a bank; four trainmen injured.

10th, 9 p. m., on Wabash road, at Wilcox, Mo., passenger train No. 14 was derailed at a misplaced or defective switch and the engine was overturned. The engineman and fireman were slightly injured by jumping off.

11th, on Denver & Rio Grande, near Eden, Colo., passenger train No. 2 was derailed; several persons were injured.

11th, on Southern Pacific, near Santa Barbara, Cal., an empty engine was derailed and fell down a bank and the engineman and fireman were killed. It is presumed that the derailment was due to high speed on a curve, but there is no witness to give information about it as the two men killed were the only persons on the engine. A party of men in a camp within hearing ran to the place, but the engineman was already dead and the fireman unconscious.

12th, on Gulf, Colorado & Santa Fe, near Cleburne, Texas, the engine of a passenger train was derailed and the fireman was injured.

24th, on Cincinnati, Hamilton & Dayton, near Johnson's, Ohio, a passenger train was derailed and the engine was overturned. The first two cars were ditched. Two trainmen were killed and two others injured.

24th, on Long Island road, at College Point, N. Y., the caboose of a freight train, which was next behind the tender, was derailed and fell down a bank. The conductor was killed and three other trainmen were injured, one of them fatally.

27th, on Pere Marquette, at Sunfield, Mich., a passenger train moving at about 50 miles an hour, was derailed and the engine fell down a bank. The engineman and fireman were injured.

28th, on Baltimore & Ohio Southwestern, at Washington, Ind., a freight train was derailed and one trainman was killed.

30th, on Erie road, at Dayton, N. Y., a passenger train was derailed and the conductor and three passengers were injured.

And 52 others on 40 roads, involving 5 passenger and 47 freight and other trains.

OTHER ACCIDENTS.

12th, on Florence & Cripple Creek, near Adelaide, Colo., a work train engaged in clearing the road after a snowslide was buried by a second snowslide; three employees were killed and four injured.

25th, on Manhattan Elevated, at East 34th street, New York City, a cylinder head of the locomotive of a passenger train was blown out and fell to the street below. Four passengers in a street car on a surface line beneath the elevated were injured.

And 2 others on 2 roads, involving 2 passenger trains.

A summary will be found in another column.

A Long Span Bascule Bridge Over the Chicago River.

Our issue of Sept. 22, 1899, page 655, contained a description of a double-track Scherzer rolling lift bridge to carry the tracks of the Chicago Terminal Transfer Railroad across the Chicago River, at the entrance to the Grand Central station, Chicago, and also of a highway Scherzer bridge to be built across the Chicago River at Taylor street, close to the double-track railroad bridge. Both of these were to replace center pier swing bridges. The article referred to was accompanied by a plat of the river at the site of these bridges, and a general plan of the proposed railroad bridge. The highway bridge has recently been completed and put in service. The double-track railroad bridge will be ready for service about the first of July.

Owing to the very acute angle at which the railroad tracks cross the channel at this point, it was necessary to make the movable span of the bridge 275 ft. long, center to center of bearings, to get a clear channel 120 ft. wide between protection piling, at right angles to the center line of the river.

The traffic to and from the Grand Central Station, owned by the Chicago Terminal Transfer Railroad, is large and expanding fast, and four tracks will probably be required in the future to accommodate the traffic. The railroad conditioned that the design should provide for a four-track bridge, entirely within the right of way lines of the company. The property lines were limited in width on both sides of the river. A double-track bridge was to be built first, and an additional double-track bridge to be added alongside when required, the two double-track bridges then to be operated either singly or as a four-track structure, as desired. These conditions could not be met by a swing-bridge, as it would have been necessary to construct a four-track swing-bridge in the beginning, because a single or double-track swing-bridge could not be enlarged, but would have to be discarded whenever additional tracks were required. A four-track swing-bridge would have been larger than needed for the present requirements, would have doubled the cost of construction, would have extended over valuable dock and property rights not owned by the railroad, and would have obstructed the river, both for navigation and the necessary flow of water required for the Drainage Canal.

The only long-span bascule bridge in existence, except the Scherzer bridges, was the Tower Highway Bridge, at London, England. This bridge, however, was very expensive for only a 200-ft. span. It is interesting to know that the operating machinery, alone, required to move the Tower Bridge, cost more than $100,000 in excess of the bids for the substructure, superstructure, operating machinery and electrical equipment for this 275-ft. double-track Scherzer bridge, ready for the rails. The Tower Bridge also has about one-half the carrying capacity, per lineal foot, of this double-track bridge. The Tower Bridge is also slow in operation. The rapid opening and closing of the Terminal Bridge was essential, because of the close proximity of the station and the frequency of trains across the bridge. The tracks at the site of the bridge being only 10 ft. above water, it is necessary to open the bridge frequently, not only for the passage of masted vessels, but also for tugs and small craft.

It was decided to build the new Scherzer bridge in the upright position, upon the site of the existing swing bridge, which was moved during the month of August, 1899, to a temporary pier about 35 ft. north of its former location. The railroad traffic crossing the swing-bridge and the vessel traffic on the river have been maintained continuously during construction.

Substructure.—The substructure of the new bridge was commenced in September, 1899. Owing to the protection pier of the swing-bridge in the center of the channel it was necessary to make the coffer-dams as narrow as possible, in order to permit the passage of vessels at this point. The coffer dams were composed of only a single row of Wakefield sheet piling. They were thoroughly braced and never showed any signs of weakness, although the earth was excavated to a depth of 26 ft. below water level, and the pits enclosed by the coffer dams were pumped dry.

The borings indicated rock at 62 ft. below datum, and the 40-ft. piles to support the piers were driven to bed rock, where possible. The piles were cut at 25 ft. below datum and the Portland cement concrete, which composed the main body of the pier, was placed directly on the top of the piles, and thoroughly rammed and tamped. Bedford stone was used to cover the tops of the piers, and extended to minus 3. Fig. 1 shows a part of the Bedford stone masonry pier on the east side of the channel, with the steel anchorage projecting beyond the tops of the piers, this view being taken on Aug. 31, 1900.

Superstructure.—Fig. 2 shows the method of shipping the rolling segments, each segment weighing about 40 tons. Fig. 3 shows the progress of the erection of the superstructure of the east leaf of the bridge, the view of which was taken on April 19, 1901. It shows the leaf erected in the upright position. The staging used in the erection of this leaf was removed to the west bank of the river and used for the erection of the west leaf of the bridge. Fig. 4 shows a side view of both leaves, the view being taken from the Twelfth street swing-bridge at the center of the river. It shows the progress of the work on the west leaf of the bridge on May 18, 1901.

As soon as the two leaves composing the bridge are completed, with the operating machinery and electrical equipment in place, they will be closed to receive the ties and rails and put in immediate service, without delay to the railroad traffic, which will be diverted from the swing-bridge. The work of removing the old swing-bridge, with the center pier and swing protection, will then proceed without delaying either the railroad traffic or the traffic on the river.

Both the Taylor street highway bridge and the railroad bridge were designed by the Scherzer Rolling Lift Bridge Company, Chicago, who also furnished the detail plans, specifications and supervision of construction. All of the contracts were let by the Sanitary District of Chicago, and all the work was executed under the charge of Mr. Isham Randolph, Chief Engineer. Mr. F. E. Paradis, Chief Engineer of the Chicago Terminal Transfer Railroad, with Mr. Ralph Modjeski as Consulting Engineer, represented the interests of the railroad company in matters pertaining to the railroad bridge. The contracts for the construction of both the substructure and superstructure of the railroad bridge were awarded to the Pennsylvania Steel Co., Steelton, Pa., the substructure work being executed by Mr. Thomas Phee, Chicago. The electrical equipment for both the railroad and highway bridges was furnished by Messrs. Geo. P. Nichols & Bro., Chicago.

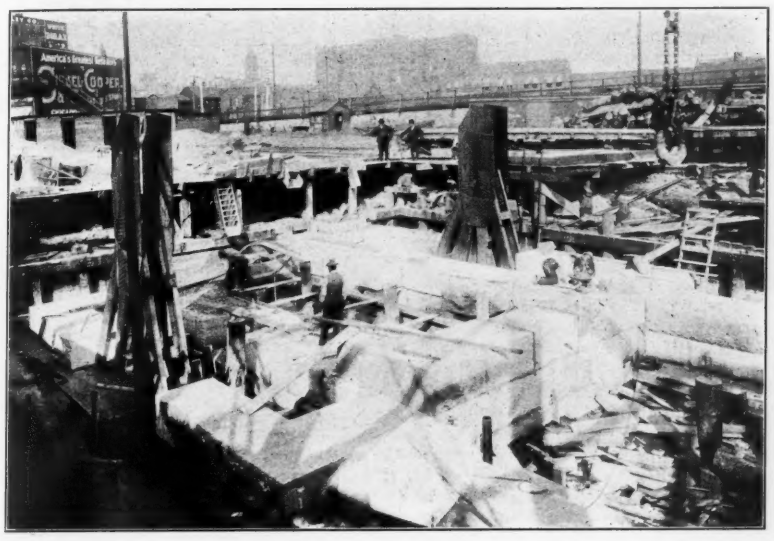


Fig. 1.—East Pier of Railroad Bridge.

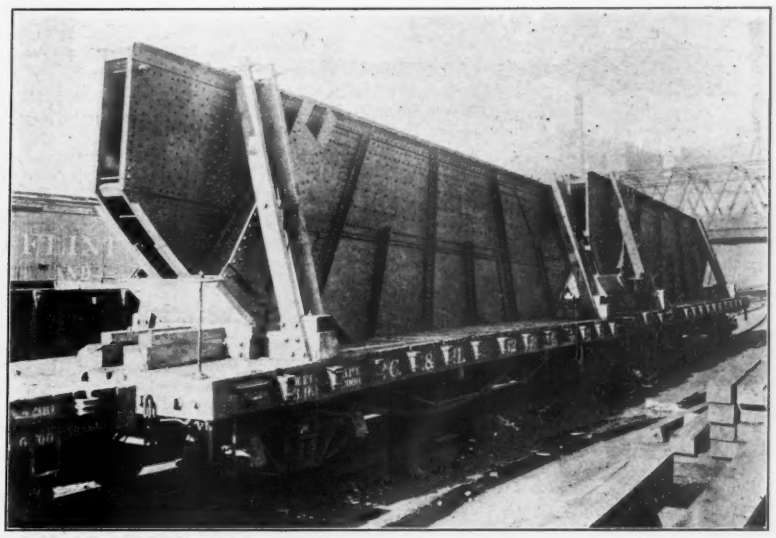


Fig. 2.—Method of Shipping Rolling Segments.

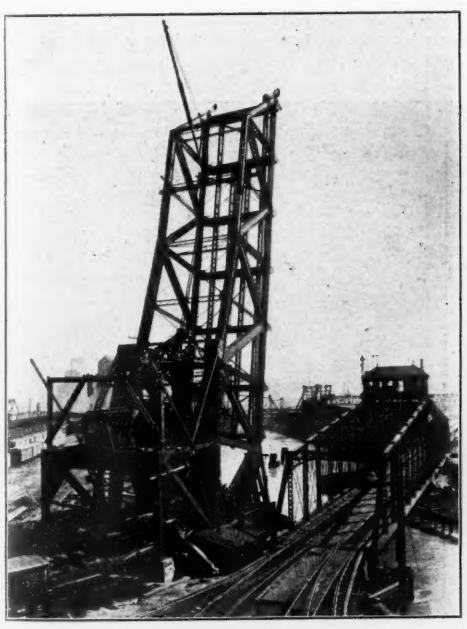


Fig. 3.—East Half of Bridge During Erection.

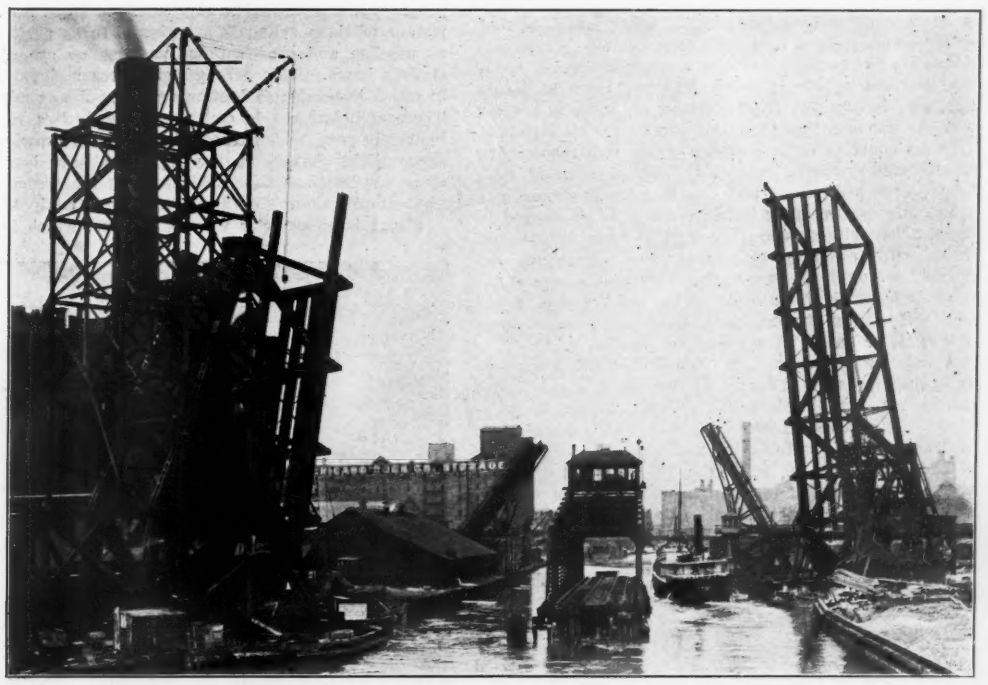


Fig. 4.—East Half of Bridge Erected—West Half During Erection.

The American Invasion of India.

Lord George Hamilton, Secretary of State for India, who was not present in the House of Commons when Sir Alfred Hickman May 23 attacked American-built locomotives and bridges, has replied in a letter to Sir Alfred Hickman. In part it is as follows:

"No practical engineer who has visited American workshops and inspected their methods of production and manufacture would for a moment indorse your assumptions. Their competition is dangerous because they are yearly improving their products, both in quality and price. . . . Up to the great recent engineering strike no order for a locomotive was ever given outside of Great Britain. Since then, owing to the British workshops being blocked with work, certain of the Indian boards found it necessary, as locomotives could not be obtained here, to place a few limited orders in America.

"I am ready to give all the available reports concerning working, consumption of fuel and load-drawing power of these locomotives. The earlier reports were unfavorable; but, when their working was better understood and alterations were made to suit the local fuel, a marked improvement was noticed, so much so that one company wishes to obtain more engines of similar construction. That American locomotives obtained a footing in India was due to the strike I have referred to. But if, as I hope, British locomotives are in the future to regain their monopoly in that vast system of railroads, British engineers must profit by the hints and suggestions these reports convey."

Concerning the Gokteik viaduct in Burmah, Lord George Hamilton says the order was placed with the Pennsylvania Steel Co. because no British firms had anything like the same experience in this class of construction. The Americans bid a less price and quicker time than any competitor. The charge made by the late supervisor of the construction of the viaduct that the riveting was defective was in no way supported by a searching inspection.

"You seem to think," he continues, "that orders have only gone abroad because those who gave them did not understand their business. I wish it were so. The competition we have to face is founded on something much more formidable and more substantial. Chemical research, the concentration of capital, thorough technical education and improved industrial organization have made in recent years a greater advance in America than here. It is with the product of these combinations and not with the assumed stupidity of the Indian officials that the British engineer has to contend. So far as I am concerned I can undertake that preference, unless the difference in price, quality and delivery is very substantial, will always be given to British firms. May I not ask you, as a leading member of the great steel industry of this country, to co-operate with me by impressing on your associates the necessity of meeting competition in the future, so as to ensure that price and time of delivery shall be on the side of British production?"

The British Board of Trade has issued its report, for the year 1900, on the working of the Light Railways Act of 1896. The number of enterprises of this kind which have been approved since the act was passed is 105. During the year under consideration the Government Treasury has agreed to make advances aggregating about $350,000. Some of these advances are free gifts and others are loans without interest. It does not appear, from the summary, what portion of this money is given outright; though from details given it seems that, of the sum just named, at least $150,000 was in the shape of free grants.

A New Connecting Rod End.*

BY C. W. HUNT.

The adjustable bearings in a connecting rod are the most troublesome to fit up of any used in steam machinery. The stresses alternate so rapidly that any looseness in the parts of the bearings is followed by such violent shocks to the mechanism that the most rigid construction is required to prevent serious injury.

The method of construction, necessarily used from the peculiarities of the ordinary designs, requires the work

Fig. 1.

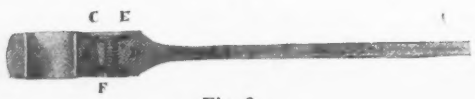


Fig. 2.

Fig. 3.

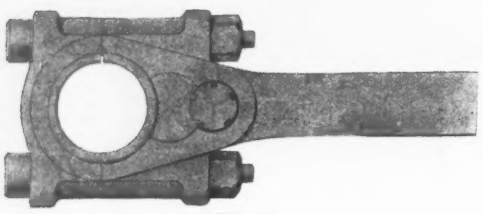


Fig. 4.

A New Connecting Rod End.

to be done on slotting, shaping, or other machines that must be manipulated by a skillful workman. These machines are not fitted to do rapid or duplicate work, nor is it convenient or even possible in many cases to obtain workmen having the requisite skill to make a bearing with the accuracy that the maker sets up for his standard.

In an effort to make a design which will require less minute measurements and highly trained personal skill, I have arranged the method of taking up the wear in a connecting rod or other bearing, which is illustrated in the cuts herewith shown. The work is done on machines which with ordinary attendance lend themselves admirably to duplicate work and accurate results.

The sides of the rod are planed off, and the ends turned or milled to bring the exterior to the finished shape shown in Fig. 1, or bolted rigidly together in Fig. 4.

A hole for the wedge B is then drilled and reamed at an inclination with the axis of the crank pin of about one in ten. In this hole the cylindrical plug B is inserted. It is made an easy sliding fit, but is temporarily held fast during the following manipulations by a wedge key, or other means, while the hole for the crankpin bushing G is bored at right angles to the axis of the rod. Both holes are cylindrical, but their angle to each other makes B a wedge, convex on the rod side and concave on the bearing side. The holding key is now removed, and B is free to move any distance in the direction of its axis, but if it is moved endwise it will throw the concave side towards or from the crankpin A. To adjust and hold B in position a screw C is fitted with two collars to embrace the ends of the wedge. This screw may be fitted wrench tight to hold it securely in any position, or it may be held by other means in large bearings.

To illustrate the delicacy of adjustment we may assume that the axis of B is at an inclination to the crank pin of one in ten, the screw C cut with twenty threads to the inch, and the head slotted with five notches 72 deg. apart, then the revolution of the screw C one notch will move B one-hundredth of an inch axially and adjust the bearing towards or from the crank pine one-thousandth of an inch.

The rigidity, accuracy, and delicacy of adjustment of this bearing are shown in the marine form of rod, Fig. 3. The bolts of the cap are drawn up tight and locked, thus holding the cap and the rod metal to metal making it in effect as rigid as a solid end rod. The adjustment of the bearing is then made as frequently and as delicately as desired. For large marine engines, mechanism for working the adjustment could be carried to a point near the cross-head, so that the bearings of both the crankpin and the cross-head pin could be adjusted with the greatest facility even while the engine is in motion. The more massive the rod the greater are the advantages of a rigidity that does not affect the ease and delicacy of adjustment.

The end pressure on B from the load is the resultant of the angle of inclination used less the sum of the frictions on the two opposite surfaces of the wedge. Proportions can be used that will result in a practical equilibrium so far as the end motion of B is concerned.

Fig. 1 shows the application of the adjustment to an ordinary valve rod in which the adjustable parts are placed in the rod in such a manner as to have the wear of the bearings affect the center to center length the least possible. The variation is here the difference in the wear of the two bearings instead of the sum of their variations, as is the case in the usual arrangement of the adjustments.

The very rigid form of this bearing, together with its delicate and accurate adjustment, makes it suitable for minute adjustments required in stamping presses.

It will be noticed that the adjustment of the bearing is a parallel motion with large bearing areas, accurate surfaces, and little or no tendency to get out of adjustment, either from long use or faulty manipulation. The delicacy of the adjustment, the mechanical accuracy of the bearing, and the decrease in the cost of manufacture over the ordinary designs will be evident to shop men. The bushing is of the best form for securing accuracy of form combined with economic manufacture. The bushings can be renewed at a comparatively small expense, when the original length of the rod will be exactly restored.

*Presented at the Milwaukee meeting (May, 1901) of the American Society of Mechanical Engineers, and forming part of Volume XXII. of the *Transactions*.

Railroad Test Car of the University of Illinois and the Illinois Central R. R.

BY EDWARD C. SCHMIDT.*

The railroad test car of the University of Illinois and the Illinois Central R. R. was described in the *Railroad Gazette* of June 30, 1900, at which time there were published drawings of the car and its apparatus. The car was completed on July 1, 1900, and has been in operation since the first of September. It is thought that the accompanying photographs and some account of the performance of the test car during its nine months of service may prove of interest. It will be recalled that the car is fitted primarily for train resistance tests and that it is equipped also with auxiliary apparatus for locomotive road tests and air-brake tests.

The dynamometer consists essentially of three tandem cylinders, in one or the other of which the pull of the engine is taken against oil. By means of the oil the pressure is transmitted to the recording apparatus. The pistons of these cylinders are ground to as perfect a fit as possible and used without packing, as are also the stuffing boxes. This arrangement gives a dynamometer in which losses due to friction are reduced to a minimum. These cylinders are in communication with a recording hydraulic gage, which traces the record of drawbar pull. Some slight changes in the apparatus have been made since the drawings were published, but the accompanying photographs show the car as it is now equipped.

Fig. 1 is an exterior view of the car, which is 45 ft.

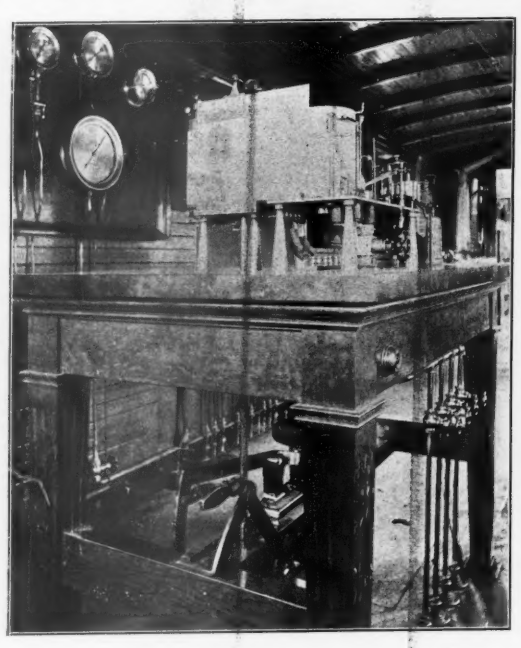


Fig. 3.—Recording Apparatus.

long and 9 ft. wide. Fig. 2 is an interior veiw, looking toward the front end. On the table at the front end are the recording hydraulic gage, the paper driving apparatus and the Boyer speed gage. On the gage-board to the right of the table are placed the indicating hydraulic gage, used to standardize the recorder, the clock which controls the electrically-operated time pen, and a duplex air gage. To the left of the table is a gage-board on which are placed the two indicating steam gages and a recording steam gage, which are used during locomotive tests to measure boiler pressure and steam chest pressure. In the foreground, on the right, are the pump, the oil and air pipes, and the valves, by which any one of the three dynamometer cylinders can be filled or emptied.

*Instructor in Railroad Engineering, University of Illinois.

Above the pump is a recording draft-gage used in locomotive testing, and directly opposite it, on the other wall, is a recording air gage which makes a record of the pressures in the train line of the air-brake system. In the rear end of the car are located four berths, lockers and cupboards, the oil reservoir and a work bench.

Figs. 3 and 4 show, in somewhat greater detail, the apparatus used in train resistance tests. Under the table is the gearing, driven from the car axle, from which motion is taken for the paper driving apparatus and for the speed gage. Fig. 3 shows the paper chart passing around the drum of the recorder. Upon this chart are drawn four lines: The datum line; the line of drawbar

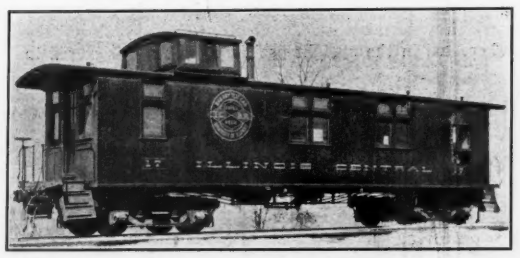


Fig. 1.—Exterior of Test Car.

pull; the location or position line, showing mile posts, stations, indicator card positions, etc., and the time line. The last two lines are drawn at the top of the chart. To the rear of the recorder is seen the speed gage, which is used simply to give a speed record auxiliary to that given by the time line.

In Fig. 5 and 6 are shown portions of two dynamometer records. Fig. 6 is from a record taken during a pulling test of an Illinois Central 12-wheel locomotive, weighing 222,000 lbs., drawing a freight train of 48 cars weighing 1,839 tons, over a grade of about 0.7 per cent. The area of the dynamometer cylinder used in this test is 60 sq. in. The scale of the original chart is 13.2 in. per mile or ¼ in. to the 100 ft., which is the same as the ordinary profile scale. If necessary this paper travel can be increased by changing one pair of gears in the paper-driving apparatus. Each inch in vertical height of the record corresponds to 247.6 lbs. per sq. in. in the dynamometer cylinder. The vibrations of the recording pen can be reduced, by throttling the opening into the recorder, without impairing the accuracy of the record. This pen is ordinarily allowed to vibrate so as to give a curve such as the one shown in Fig. 5, the area under which can be very conveniently found by a planimeter.

The pen which draws the line just above the drawbar

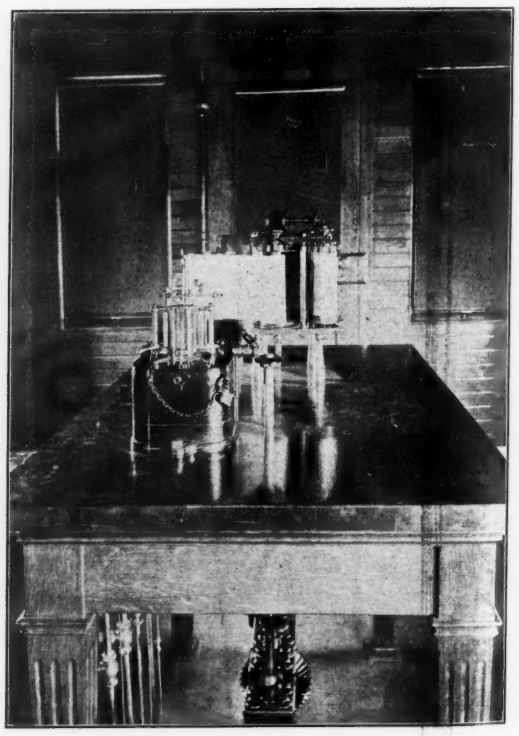


Fig. 4.—Recording Apparatus.

pull curve is operated electrically by push-buttons located in the observatory and in the small projecting windows at the front end of the car. By it are recorded the positions of the mile-posts, stations and stops and also the points at which indicator cards are taken.

The pen which draws the line at the top of the chart is controlled by the clock which makes electric contacts every five seconds. All calculations are based upon this time record, the record made by the speed gage being used merely to give the general character of the speed curve and to aid in interpreting the time record. Below the charts in Figs. 5 and 6 are shown the profile of the road, which were redrawn and placed with the dynamometer record.

Fig. 6 is a part of the record taken behind Engine 501 of the Peoria & Eastern Division of the Cleveland, Cincinnati, Chicago & St. Louis. The train weight in this

case is 776 tons in 29 cars. This record was taken during a test for the calibration of dynamometer car 609, owned by the University of Illinois and the Peoria & Eastern. This dynamometer car is similar in essential arrangements to the Illinois Central test car, except that its single dynamometer cylinder has a cup leather piston packing and also a leather stuffing-box packing. In this test both cars were coupled together and operated in the same train for the purpose of determining the frictional resistance in the leather packings of the dynamometer car.

In addition to the various train resistance tests made with the test car, it has been in operation, during October and November, in a series of tests made on the Illinois Central between Centralia and Cairo, Ill., for the determination of the relation between indicated horse-power and draw-bar horse-power of four types of freight locomotives used in that district. It is at present being used in a series of exhaust nozzle tests between Champaign and Chicago, on the Illinois Central.

Fig. 2.—Interior View, Showing Front End.

The operation of the unpacked dynamometer cylinder, about whose success much doubt was expressed, has proven entirely satisfactory. The leakage of oil from the cylinders, even under sustained pressures of 700 and 800 lbs. per sq. in. has been so slight that no inconvenience has been experienced in keeping the cylinder full of oil. This leakage insures perfect lubrication and in no way prevents the full pressure in the dynamometer cylinder from being transmitted to the recorder, since the piston must instantly follow into the space vacated by the oil. Under continuous pressures of from 200 to 300 lbs. per sq. in. in the cylinder, they will operate without refilling for two hours and a half, during which time the piston will move forward, on account of the escape of oil, only 1½ in. By its certainty of action and its convenience of operation the system of oil transmissin of the draw-bar pull has clearly demonstrated its advantage for dynamometer cars.

The Mechanical Engineers.

The forty-third meeting of the American Society of Mechanical Engineers began Tuesday evening, May 28, at the Plankinton House, Milwaukee, Wis. The last session was Friday evening. Up to Friday morning, 340 had registered, which may be considered a very good attendance.

At the opening session Tuesday evening the Society listened to an address of welcome by Prof. Warren S. Johnson, President Wellman responding. Two papers were then presented. One session was held on Wednesday, one on Thursday, and two on Friday. A reception was held Wednesday evening. Inspection trips were made to the plants of the Edward P. Allis Co., Nordberg Manufacturing Co., Filter & Stowell Manufacturing Co., Vilter Manufacturing Co., Christensen Engineering Co. and the Bucyrus Co. In all 25 papers were presented, the discussion being brief in most cases, and a few papers brought out no discussion. Short abstracts of some of the papers follow:

Bevel Gear Cutting Machines at Paris; By Fred J. Miller.—Mr. Miller's paper is a pamphlet of 49 octavo pages, with numerous illustrations, and is one of the best papers presented, although, naturally, the number of people interested in the subject is comparatively small. Mr. Miller points out that the use of bevel gear planing machines is more common in Europe than here, and the use of bevel gears with teeth cut by a formed rotary cutter is correspondingly less common. At the Paris Exposition six machines were shown for planing the teeth of bevel gears. Five of these were of European design and one was American. An American machine for milling the teeth was also shown. One of the planing machines was that built at the Bouhey Works, in Paris. This had a new feature in providing for cutting helical instead of straight teeth.

Two machines were shown by the Oerlikon Works, of Switzerland. These are not automatic and not new in principle, but interesting for the ingenious and creditable design. A machine was shown by the Ernault tool building works, of Paris, invented by Mr. Monneret, directing engineer of those works. This machine generates the tooth form, making an involute tooth, using the principles employed many years ago by Mr. Bilgram, of Philadelphia. This new machine produces a helical tooth instead of a straight one. Another generating machine was shown by Smith & Coventry, of Manchester, England. This makes a straight tooth, the form being a circular approximation to the involute. The Gleason Tool Company, of Rochester, showed a fully automatic bevel gear planing machine and also a tool for generating the tooth templets by which the gear teeth are formed. Another machine was exhibited by Mr. C. D. Rice, who was formerly Master Mechanic of the Tool Manufacturing Co.'s factory at Hartford. This is of the template variety and does not generate tooth curves. All of these machines are described in detail, with excellent illustrations.

Locomotives at the Paris Exposition; By Storm Bull.—Prof. Bull's paper is useful because it collects in one pamphlet engravings and brief descriptions of all the locomotives shown at the Paris Exhibition of 1900. The information is old now, having been repeatedly published in different shapes, even by Prof. Bull himself in papers before railroad clubs, etc., but it is important information.

Electricity in Shops; By William S. Aldrich.—This paper is a running review of the requirements for the use of electricity in driving machinery. It adds nothing new, so far as we see, to the knowledge or discussion of a subject now pretty well worn. The time has come to collect facts, rather than to generalize, on this particular subject.

Ball Step Bearings; By C. H. Benjamin.—In 1899 and 1900 some investigations were made on ball bearings under the direction of Prof. Benjamin by senior students of the Case School at Cleveland. The apparatus was designed and built by two students of the class of 1899 and further experiments were made the next year by two other students. Figures for the ultimate crushing strength of ball bearings are misleading as balls do not fail in this way. It seemed desirable to make experiments which would show behavior of steel balls running at various speeds under gradually increasing pressures, to measure the power consumed and to determine the manner of failure. The apparatus consisted of a pulley revolving around a vertical spindle. On the top of this pulley was a hardened plate on which the circle of balls rested and again on these balls was another hardened plate. The balls were held in position by two retaining rings and weight was applied above this top plate through the crosshead of the testing machine. The apparatus was simple and flexible and permitted the use of various sizes of plates and any desired speed and pressure.

Some interesting phenomena were discovered, which are described in the paper. Under a load of 2,000 lbs., with ¼-in. balls, flat plates, and 375 r. p. m., there was a radial pressure of the balls on the outside retaining ring. This cut a groove in the ring, and when the ring was allowed to revolve freely with the balls each ball indented the ring. It was first thought that this was due to springing of the plates under pressure, and plates were made slightly concave. This made matters even worse. It was then surmised that the pressure of 2,000 lbs. and upward on 30 balls, ¼ in. diam., was sufficient to distort the balls and change each sphere into a partial cylinder, which cylinders would tend to roll tangent to the circle and thus press against the outer ring. Acting on this suggestion the plates were ground slightly convex with decided improvement, it being possible to run the pressure up to 3,000 lbs. without excessive friction. The author concludes that under heavy pressures and long continued wear a ball step bearing is a very uncertain quantity unless so designed as to eliminate the outward radial pressure of the balls, and further, that no pressure approaching the crushing strength of the balls can be tolerated. The results of experiments giving load, horse power, etc., are tabulated.

Filtration Plant at Albany; By William O. Weber.—This short paper describes briefly the fine filtration plant designed and built by Mr. Hazen for the Albany water supply. A detailed description is given of a duty trial of engines and pumps. A very complete account of this filter plant may be found in the *Transactions* of the American Society of Civil Engineers.

Blue-printing by Electric Light; By H. G. Reist.—A short paper describes the apparatus devised and

(*Continued on page 386.*)

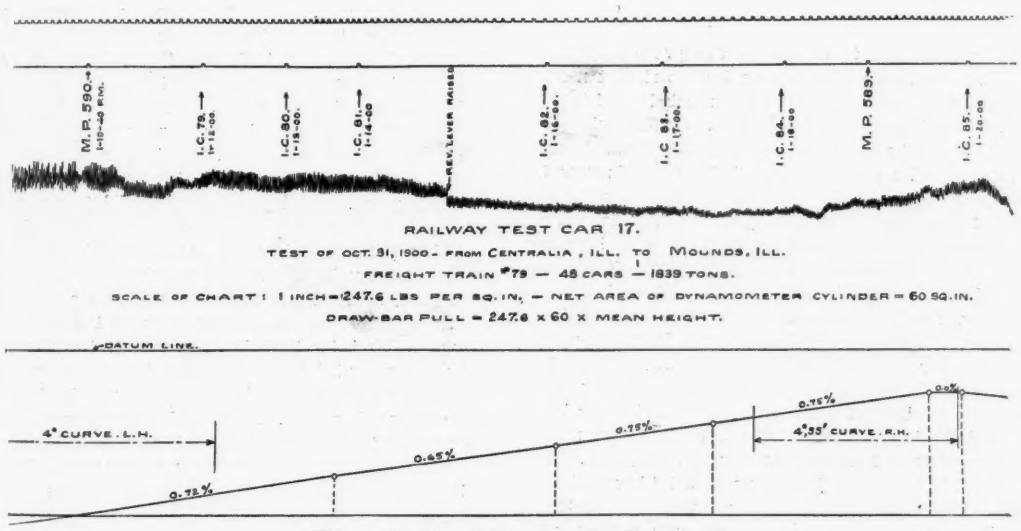


Fig. 5.—Portion of Dynamometer Record.

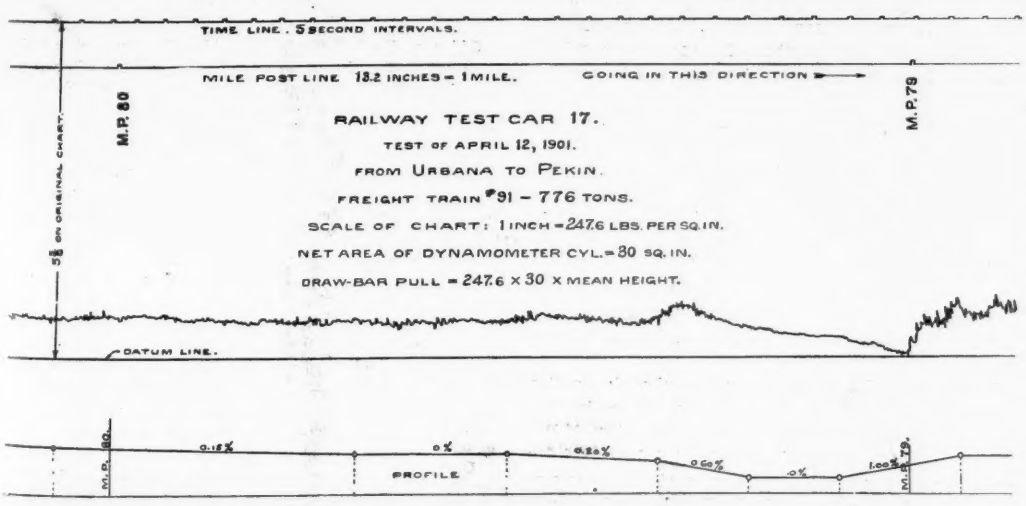


Fig. 6.—Portion of Dynamometer Record.

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EDITORIAL ANNOUNCEMENTS.

CONTRIBUTIONS—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

ADVERTISEMENTS—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and these only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

During the month of May we mentioned in our news columns orders for 13,505 cars and 192 locomotives. These figures may be compared with 9,786 cars and 99 locomotives ordered in the corresponding month last year. It will be seen that a big increase is shown over last year's orders, and this increase has been shown each month this year. The May car orders are divided as follows: Box, stock and refrigerator cars, 8,490; coal and ore cars, 3,035; flat cars, 1,610; tank cars, 113, and passenger cars, 257.

The spring meeting of the American Society of Mechanical Engineers at Milwaukee was one of unusual success. While there was no lack of engineers who by their work have won distinction in their chosen field, the occasion was made significant by the presence of an unusually large number of young men. The professional sessions were well attended, the papers presented were numerous and good, and the discussions, while not all that could have been desired, doubtless possessed the usual degree of merit. In respect to its discussions, however, the Mechanical Engineers have much room for improvement.

At the Milwaukee meeting of the American Society of Mechanical Engineers, notice was given that at the next annual meeting of the society, which occurs in December, there will be offered an amendment to the rules providing for an increase in the annual dues. Originally, we believe, the dues for full members was fixed at ten dollars, but this was changed some years ago to fifteen dollars. A further increase is now proposed, making the dues for full members twenty-five dollars, and increasing slightly the fees of associates and juniors. The question thus introduced is of great importance to the future welfare of the society, and will receive the careful consideration of its members. The reason for it is to be found in the fact that the society at present expends its full income. Many members believe that its work has not yet reached a state of maximum efficiency, and some are decided in their opinion that something will soon need to be done to provide more extensive accommodations at the home office. Especially there is a demand for a larger and better appointed auditorium. It appears that as matters now stand it is practically impossible for the society to finance any plan for extending the scope of its work. Its members are in fact receiving in the form of advance papers, of published proceedings, and of clerical and expert service necessary to the production of these, practically all of the money which they now pay in. This fact and a desire on the part of the Council to increase the efficiency of the society lead naturally to such a proposition as has been referred to, and which, if it should be concurred in by the society, will result in an increase of its annual income by about $20,000. There are, of course, obvious objections to increasing the expense of members, and to some these will appear insurmountable. The tendency of the change will perhaps be to make the society somewhat less democratic, and in so far as this may prove true, it is to be regretted, but probably the extent to which this objection applies is small. Evidently, the Council does not believe that the proposed change will result in loss of members, or that it will work any particular hardship upon any individuals. It seems likely, therefore, that the membership will agree with the Council that the larger question is the important one, and that the proposed amendment will in the proper time prevail.

The Baltimore & Ohio.

The latest change in the presidency of the Baltimore & Ohio Railroad seems to demand special attention for two reasons: First, it proves that the Baltimore & Ohio has entered into relations as to ownership and as to policy which will put it in a stronger position than it has occupied for many years, relatively stronger probably than any position which it has held for at least a quarter of a century. Second, it will put the personnel of the Baltimore & Ohio on a footing such as it has never yet occupied.

We shall first speak very briefly of the new relations. We suppose that Mr. Loree would not have accepted the Baltimore & Ohio presidency if he had considered it an interruption of his career as a Pennsylvania officer. We judge that the President and directors of the Pennsylvania would have objected strenuously to the severing of his relations with the Pennsylvania. What we are saying now is not restating anything that we have been told by any one; it is merely summing up matters and events that we have observed for the last six years, and of course it is only conjecture.

It was about six years ago that Mr. Loree was offered the general managership of a big railroad. He was then a division superintendent on the Pennsylvania lines. He was soon convinced by his superior officers that he was a substantial and permanent part of the great organization which he was serving, and he stayed with it. Something of what has happened since every one knows. It is not likely that a man so judicious and far-seeing could have been lured away from a career of assured power and distinction with a company with which he was solidly identified to take even the presidency of a road so great as the Baltimore & Ohio if that meant cutting the line of advancement, much less if it was to involve him in anything like a conflict with the road which he must regard as his home road. Further, while the Baltimore & Ohio stands now in a position from which its owners may reasonably look forward to substantial prosperity, it is not in a position for an exhausting struggle with its powerful neighbors, and a man with so much to lose would not be apt to court such a struggle. Still further, the Pennsylvania Railroad Company is a large stockholder in the Baltimore & Ohio. The first of this year it owned something like one-sixth of the Baltimore & Ohio stock. Since that time this ownership has probably been largely added to, but we have no official information of the extent of the recent purchases, and it is not worth while to guess.

All of these things justify us in thinking that this event means that the Baltimore & Ohio is now to be practically a part of the Pennsylvania system, and we suppose that the stockholders and the communities served will all recognize speedily, if not at once, their gain in such an arrangement. It is reasonable to suppose that the physical improvements which have been important in recent years will be carried on so far as the efficiency and economy of operation demand. It is not reasonable to suppose that any novel things will be done, and we shall not expect to be startled by vast new schemes of improvement or by great changes in traffic geography or operating geography. We judge that the first traffic results to be sought will be the development of the freight earning capacity of the road to its highest efficiency. It seems probable that efforts to improve and develop passenger business will be directed rather towards local business than through business, but all of this is mere conjecture.

Of course there has been some apprehension and a little wild talk as to the effect of the change in control and policy upon the city of Baltimore itself. We do not suppose that anybody who thinks carefully over these matters has any apprehension. It is not likely that the Pennsylvania Railroad people would be slow to appreciate the physical and strategic advantages of the grand port of Baltimore.

We will now take up the second topic, namely, the effect of this change on the personnel of the Baltimore & Ohio. We have said that it will put the personnel of the road on a footing such as it has never yet occupied. We think it is quite just to say that the theories on which the working staff of the Baltimore & Ohio has been recruited, organized and maintained have never yet been the best modern theories. It is true that the elder Garrett had some fine and rather liberal notions concerning his employees, and was disposed at one time to go further than any railroad company was then going in the education of certain classes of his employees; but at bottom Mr. Garrett represented, through and through, the feudal period of railroading. He had no sympathy with, even no conception of, the modern doctrines as to organization and administration. On the other hand, Mr. Loree is one of the most modern railroad men. To begin with, he is a professional man by training and by instinct; then he has a philosophical cast of mind which leads him to study social and economic problems more thoroughly than most men have patience to do, and back of it all is intimate familiarity with the organization and administration of what is probably the best organized railroad property in the country. The notions which underlie what we have spoken of as the modern theory of railroad organization are, careful selection with regard to physical, intellectual and moral qualities; steady promotion by merit, with decent regard for seniority, other things being equal; constant watch of the corps and prompt removal of vitiating elements; fixity of tenure.

A high corps spirit is one of the valuable assets of a railroad company. Perhaps in times of close competition it is one of the most valuable. Money cannot make this; general orders cannot make it; it is a plant of slow growth. A year of arrogance, or stupidity, or coarse sense of justice may destroy the growth of years. We have all seen, time and again, examples of the truth of this statement; and here we suggest a matter for the serious meditation of the gentlemen who have suddenly taken on such great importance in the railroad world: The prosperity of a great undertaking depends ultimately on the skill, zeal and devotion of its servants. That fact we cannot get away from, although we are sometimes tempted to forget it. No ability in combination of ownerships; no lavish expenditure in physical improvement; no headquarters' orders for economy all along the line, can command prosperity without the devoted co-operation of the working staff. We have lately seen instances of both stupidity and arrogance on the part of some financiers which make us fear hard times ahead for the properties they control.

But to return to our subject: it may be said with confidence that the Baltimore & Ohio personnel may now have a sense of security such as it has not felt for many years. In fact, as we understand—and we feel quite confident of this—the only men whom Mr. Loree has taken with him from the Pennsylvania are those who may be considered members of his personal staff, namely, a general manager, an assistant general manager and three assistants to the general manager. We judge that the four last mentioned will be largely occupied in special staff duties, and some notes of their careers and qualifications will be found in the personal column. None of these gentlemen displace present officers of the Baltimore & Ohio, and we do not suppose that any other changes are likely to be made, at least not from the initiation of the new President.

Annual Reports.

Chicago, Rock Island & Pacific.—The report of this company is for the year ending March 31. After three years' continuous gains in gross earnings, which up to the close of the 1900 fiscal year had added $8,218,000 to the gross revenue of 1896, the increases in receipts reported this year are as large as in any recent year. For 1901 the gain in total revenues is reported at $2,140,000, as against $1,983,000 in 1900. In both years, however, the larger share of the new revenue was absorbed in higher operating charges, so that the increase in net earnings last year was but $531,000.

One feature of the report, indicating the ability to hold average rates as well as increase tonnage, is shown by the fact that percentages of increase in receipts bear direct relation to the relative gains in traffic, both in the passenger and freight departments. Another point of interest is that, as in previous years, so large a share of Rock Island's new revenue is gained by growth of local business, especially in the passenger department. The gain of 11¾ per cent. in freight revenue compares with about 11½ per cent. increase in ton mileage, while the average ton-mile rate has remained at 9.9 mills for three

years. As regards division of the gains in revenue between local and through business of the $859,000 additional passenger revenue reported for the year, $817,380 was from business originating on the company's line. Of the increase of $1,849,000 in freight earnings, $1,200,000 was on interchanged freight, while local freight receipts increased $650,000, or 10 per cent., the through freight accounting for 59¾ per cent. on the total receipts.

These increases in business brought operating receipts for the first time above $25,000,000, the actual figures being $25,364,695. Operating expenses and taxes absorbed 67⅔ per cent. of this, against 66 per cent., leaving net earnings at $8,199,600. Income from investments and other sources was sufficient to bring this net income up to $8,900,000, which left a balance of $5,097,000 available for dividends on the stock, of which $50,000,000 is outstanding. As showing how railroad conditions, as measured by surplus divisible balance have changed in a few years, it may be pointed out that last year's surplus, equivalent to over 10 per cent. on the stock, compares with but $1,427,000 in 1896.

This comparison ignores the heavily increased charges for improvements and new equipment, charged under operating expenses, and formerly paid for out of capital account, or not provided at all. Of last year's increase of $2,140,300, or 15 per cent. in operating expenses, the largest share, as in previous years (two-thirds of the total increase in 1901), is accounted for by higher maintenance charges. The more important improvements of the last year were in replacing temporary bridges with permanent structures, or with earth fills. Rail and tie renewals cost $383,000 more than in 1900, the larger expense being in part due to higher cost of materials. This is brought out in a table showing the principal items used in track repairs and the cost. The increased cost of supplies, as shown by this table, is not, however, as large as was shown in the 1900 report.

Besides the improvements and betterments carried out last year on the main line and charged against operating expenses, the company expended $452,900 for new equipment and $586,000 for other work on existing lines, of which the chief items were $254,000 for lands connected with yard and terminal works, at important points; $75,000 for the new yards at Hawthorne, near Rock Island, and $185,000 for 27 miles of additional side track.

Total charges to construction and equipment account were $3,139,000, of which over $2,000,000 was for construction of new lines in Oklahoma and Iowa. The latter work was the more important, consisting of 109 miles of new road, built to protect the business contiguous to the Des Moines & Ft. Dodge Division from encroachment by other companies building in that territory. The road was opened in November last, and represents an investment of $1,479,000. With about 60 miles of new line in Oklahoma the line owned is brought up to 3,128 miles, against 2,956 miles a year ago, and the total mileage to 3,819 miles. The line operated under trackage rights is 338 miles, a large proportion, and for which the company pays $418,000 in annual rental. More important, however, than the figures of mileage so worked or the rentals paid, is the fact that the company is dependent on trackage rights to reach very important towns; thus 54 miles are used into Kansas City, 67 miles into Topeka, 90 miles into Denver from the north and 120 miles from Pueblo to Denver, and 7 miles into Omaha. In view of this the report that the company's plans for the current year include the building of new lines into most of these cities is an interesting one.

April Accidents.

Our record of train accidents in April, given in this number, includes 72 collisions, 148 derailments and 4 other accidents, a total of 224 accidents, in which 52 persons were killed and 154 injured. The detailed list, printed on another page, contains accounts only of the more important of these accidents. All which caused no deaths or injuries to persons are omitted, except where the circumstances of the accident as reported make it of special interest.

These accidents are classified as follows:

Collisions.	Rear.	Butting.	Crossing and other	Total.
Trains breaking in two	6	0	0	6
Misplaced switch	2	2	7	11
Failure to give or observe signals	3	2	4	9
Mistake in giving or understanding orders	0	5	0	5
Miscellaneous	2	3	10	15
Unexplained	4	6	16	26
Totals	17	18	37	72

Derailments.

Broken rail	4	Careless running	1
Loose or spread rail	3	Track repairers	2
Defective bridge	3	Bad switching	2
Defective switch	3	Runaway	2
Soft roadbed	1	Animals on track	4
Broken wheel	12	Landslide	8
Broken axle	6	Snowslide	1
Broken truck	1	Washout	4
Fallen brakebeam	2	Flood	1
Failure of drawbar	3	Malicious obstruction	2
Loose wheel	1	Accidental obstruction	4
Broken car	1	Unexplained	68
Boiler explosion	1		
Misplaced switch	6	Total	148
Derailing switch	2		

Other Accidents.

Cylinder explosion	1
Other causes	3—4
Total number of accidents	224

A general classification shows:

	Collisions.	Derailments.	Other acc'dts.	Total.	P. c.
Defects of road	0	14	0	14	6
Defects of equipment	6	27	1	34	16
Negligence in operating	40	15	0	55	25
Unforeseen obstructions	0	24	3	27	12
Unexplained	26	68	0	94	41
Totals	72	148	4	224	100

The casualties may be divided as follows:

Killed:	Collisions.	Derailments.	Other acc'dts.	Total.
Employees	17	27	3	47
Passengers	1	1	0	2
Others	2	1	0	3
Totals	20	29	3	52
Injured:				
Employees	43	60	4	107
Passengers	23	12	0	35
Others	0	8	4	12
Totals	66	80	8	154

The casualties to passengers and employees, when divided according to classes of causes, appear as follows:

	Pass. killed.	Pass. injured.	Emp. killed.	Emp. inju'd.
Defects of road	0	0	4	4
Defects of equipment	0	0	2	8
Negligence in operating	1	26	18	48
Unforeseen obstructions and malicious	1	2	15	28
Unexplained	0	7	8	19
Totals	2	35	47	107

Thirty-five accidents caused the death of one or more persons each, and 42 caused injury but not death, leaving 147 (66 per cent. of the whole) which caused no personal injury deemed worthy of record.

The comparisons with April of the previous five years shows:

	1901.	1900.	1899.	1898.	1897.	1896.
Collisions	72	69	38	50	36	21
Derailments	148	133	74	68	63	72
Other accidents	4	5	2	7	6	1
Total accidents	224	207	114	125	105	94
Employees killed	47	31	18	17	16	22
Others killed	5	5	6	1	5	6
Employees injured	107	93	39	23	54	49
Others injured	47	53	29	25	36	15
Average per day:						
Accidents	7.47	6.90	3.80	4.17	3.50	3.13
Killed	1.73	1.20	0.80	0.60	0.70	0.93
Injured	5.13	4.86	2.22	1.60	3.00	3.47
Average per accident:						
Killed	0.23	0.17	0.21	0.14	0.20	0.30
Injured	0.68	0.71	0.60	0.38	0.86	1.10

We have no record of any passenger killed in a passenger train this month, a statement which we have not before been able to make since May, 1900. In the number of employees killed the present record is, however, worse than that of any previous April since 1891. The total, 47, is more than twice that of any April between 1893 and 1900. The increase in the total number of trains involved is also very large.

The worst passenger train accident in April was that at Bradley, Cal., on the 10th. Mr. D. O. Mills' private car was in this train and also was in the collision at Emigrant Gap on the 30th. Other noticeable accidents were the derailments at Wells, Nev., and Spring City, Tenn., on the 7th, Gulf, N. C., on the 4th, and near Santa Barbara, Cal., on the 11th.

The total number of street car accidents reported in the newspapers in April was small, only 11; and the number of casualties was only 23, none of them reported as fatal.

I. C. C. Accident Reports.

The Interstate Commerce Commission has notified the railroads to begin on July 1 to report accidents to the Commission, in accordance with the law passed by the last Congress and noticed in the *Railroad Gazette* of March 15. The notice is accompanied by blank forms. As the law does not require reports to be sent in before the thirtieth day following the end of each month, the Commission will not have any complete statistics until after Aug. 30. This law does not require reports of all accidents. In train accidents it covers collisions and derailments, but omits the small class of "miscellaneous," which, in the *Railroad Gazette* records, have usually constituted from 3 to 5 per cent. of the total. It covers casualties to passengers and employees, but not to any other persons, thus excluding highway crossing accidents and the tramps. Though the miscellaneous train accidents, such as boiler explosions, breaking of side rods, and fires, will not go on record as train accidents, they will be accounted for, whenever any employee is seriously injured by them, as the record of casualties covers cases due to all causes.

The Commission puts the limit of train accidents at $150 damage to the company's property; a case doing less than that amount of damage and injuring no person is not to be reported. Injuries to passengers are to be reported in all cases, but those to employees only when the injured person has to lie off three days out of the first ten following the injury. This rule excludes a much larger percentage of minor cases than that of the English Government, which deems a man injured if he is kept from his work for five hours on any one of the three working days next after the day of the accident.

A separate sheet is required for each collision or derailment. A separate sheet is required for each occurrence other than a collision or derailment, in which one or more persons are killed or injured. In this last mentioned class (Class C)—which includes falling from cars, coupling accidents, being run over, etc.—the names of killed and injured employees are required; but in collisions and derailments they are not. This seems to indicate a purpose on the part of the Commission to give particular attention to accidents in which the Federal laws concerning couplers and grab irons may come up for consideration. In fact, the instructions for filling out this class of reports make reference to these laws. The Commission has lately issued a code of detailed rules for the use of its inspectors in looking for violations of these laws and has sent copies of this code to the railroads.

The instructions for making the reports state that accidents to employees on boats, or in shops or other places remote from the railroad, are not to be reported. The term "killed" is to include persons injured who die within 24 hours. Passengers are divided into two classes, the second class including drovers and other persons riding on freight trains. The class of employees heretofore shown in the annual reports of the Commission, called "switchmen, flagmen and watchmen," is retained, but it is now clearly defined so that it will be known what it includes, to wit, all switch tenders (not including switchmen on switching train crews), lever men, lamp men, track, bridge and crossing watchmen, policemen and detectives.

Where an injury to an employee may have been due to his own inexperience or ignorance, a statement of his record is required; but the facts, so familiar in English reports, about how long a man had been on duty, are not asked for. But if an employee responsible for a train accident has been on duty more than 15 hours, without more than two hours' intermission, or has had less than seven hours' rest before going to work, the facts are required to be stated.

Cases of trains breaking in two and the parts coming together are classed in miscellaneous collisions. A collision on a crossing must be reported by both roads. Derailments are divided into 12 classes: Defects of road; defects of equipment (other than couplers and power brakes); defects of power brakes; defects of couplers; misplaced switch; at interlocked switches; at derailing switches; at drawbridges; accidental obstruction; malicious obstruction; other causes; cause unknown. Casualties not due to collision or derailment are also divided into 12 classes: train accidents; bursting of boiler; coupling; other work about trains; striking overhead bridges, etc.; falling from cars; getting on or off; others on or around trains; being struck or run over; working on track; in freight houses, etc.; other causes.

A large space appears on each blank for a statement of the "nature and causes of and circumstances attending" the accident. This is the principal feature in which the requirements of these reports differ from the requirements of the English Government and of most of the states in this country. The clause quoted is in the language of the statute, and little attempt is made to explain in detail what is required. Most or all of the accident reports now and heretofore made by railroads to State Commissions give the cause very briefly. In Massachusetts and some other states a separate sheet is sent in for each accident, as is now required by the Federal Government, but few or no details are given. The Interstate Commerce Commission does not say whether it wants more or less than the states require, though the particular requirements in some of the classes would seem to indicate that it wants a good deal more. In the main, each railroad manager is left to decide for himself how fully he will describe the circumstances connected with an accident, whether it be a collision or a fatal injury to a brakeman or what not; or how much in detail he will explain the cause of a collision due, for example, to the negligence of two or more persons, or of the explosion of a boiler. In the case of failure of power brake apparatus or couplers, however, the name or style of the apparatus is asked for. If a man catches his foot in a frog the report must state whether or not the frog was blocked. Where an accident is due to failure of air-brakes or improper use of them a full explanation is required. The most comprehensive requirement is that the report shall show "the principal facts explaining the cause of a collision or derailment as usually reported by a division Superintendent."

We have ventured recently (May 3) to repeat our old arguments against reducing rates just as everyone wants to travel. Yet there are times and places when low rates are profitable. For example, the pilgrim season in France opened April 24, and in two days no less than 60 trains, carrying 50,000 pilgrims, were despatched for Lourdes from the Orleans station in Paris, without interruption of the regular passenger train service. These pilgrims are carried at very low rates, but with trainloads such as indicated above, averaging more than 800, or 17 times the average of all passenger trains in this country, they may be very profitable at a small fraction of the regular rates, especially as they have scarcely any effect on the other passenger traffic. For the accommodation of the pilgrims after they reach Lourdes, special trains are run between Lourdes and the more considerable towns nearby between 10 p. m. and midnight, to enable the people to get lodgings.

The Prussian Minister of Public Works, reviewing ten years' activity of the ministry, had no need to blush in relating the results of the Kingdom's investment in railroads. By the end of 1899, the amount of capital which had been invested had been $1,761,250,700, and of this no less than $711,355,887, or about 40 per cent., had been retired by the application of available net profits of the system over fixed charges. In 1899, after the applications of profits to retiring railroad debts, the railroad system turned over very nearly $50,000,000 for the use of other departments of the government.

The Mechanical Engineers.

(*Continued from page 383.*)

used by the General Electric Company at Schenectady. There are two arc lamps with enamelled parabolic reflectors. These lamps are carried on a trolley and can be moved from place to place in the room. They command five printing frames, which are the standard frames used for sun printing. In general, the time required is three or four times as long as with bright sunlight.

Painting Iron Work; By M. T. Wood.—Under the title of "Protection of Ferric Structures," Mr. Wood submits a pamphlet of 54 pages. He reviews the state of the art pretty thoroughly, examines somewhat the various important recent papers on the subject and gives a good deal of his own opinion. The pamphlet will be useful because of its references to tests and to recent discussion quite as much as because of the opinion expressed, although that has its value.

Portable and Stationary Tools; By John Riddell.—Mr. Riddell's paper is short and is made up mostly of engravings from photographs of various portable tools in use at the works of the General Electric Company at Schenectady, which are briefly described. As is well-known, a good deal of very heavy work is done at those works by portable tools. Some of the advantages of these are set forth in the paper.

Records of the Draughting Room and Shop.—Mr. A. W. Robinson contributes a paper on "Rules for a Draughting Office," Mr. George H. Marr one on "Filing and Indexing Data" and Mr. Frederick O. Ball one on "Draughting Room and Shop Systems." The scope of this group of papers is sufficiently indicated by their titles. They will be found useful to those who are studying along this line. Doubtless specialists in the organization of records and information will find in them something new and suggestive.

NOTES ON THE DISCUSSIONS.

The Committee on *Standardization of Methods of Making Engine Tests* in presenting a preliminary report said that the report was brought before this meeting mainly that it might be in the hands of the members and be criticised previous to making a final report at the annual meeting. It was not expected, on account of its size, that it would be discussed at length at the meeting, but it was hoped it would be the subject of written discussion. The point was brought up as to the proper value to use for the mechanical equivalent, 774 being suggested as preferable to 778. The committee explained that in its recommendations for engine brakes it only intended to recommend a brake which was self-adjusting.

The Committee on *Engine and Generator Proportions* read its report, it not having been printed in advance. It appears to be possible to soon establish standard engine and generator dimensions for direct current machinery of 200 k.w. and under. The principal makers have agreed to adopt the recommendations of the Society. The committee does not intend considering alternating machinery.

In discussing Prof. Storm Bull's paper on *Locomotives at the Paris Exposition*, Prof. Goss called attention to locomotives of the Northern Railroad of France having two pairs of cylinders at different points of the frame which act on separate crank pins. It was pointed out that the American idea in locomotive construction was strongly in favor of simplicity, but he was of the opinion that there was a degree of complication which had its advantages. In large compound locomotives it was already necessary to use four cylinders, as there was not room within the clearance lines for two-cylinder compounds of the largest power now called for. If four cylinders are used the advantages of the French arrangement are that perfect balance of the reciprocating parts is secured; the power is not concentrated on two crank pins, but is taken on four, permitting smaller sizes to be used for the connecting parts; further, this distribution of the power over a greater length of frame permits the whole frame to be lightened as the stresses are materially reduced. It was said that the strains in American engines are enormous, and the frames must be made unduly heavy or they are weak. The engines of the Northern Railroad were thought to indicate the solution for many of the difficulties in heavy locomotive construction.

J. I. Astrom's paper on *Fly-wheels and the Angular Variation of an Engine* was discussed at some length. Mr. W. L. Abbott, Chicago Edison Co., described a method he had used satisfactorily for estimating the speed variation of a 3,500 h.p. vertical cross-compound engine, his remarks being illustrated by diagrams. A full explanation of his method will be found in *The Technograph*, just issued by the University of Illinois, and is of value to those interested in alternating current machinery. A point brought out in the discussion is that with compound engines, where close regulation is essential, the fly-wheel can be greatly lightened if the cranks are placed at an angle other than the usual 90 degrees. In some large engines recently built the crank angles were made 135 degrees. This close regulation is very essential where engines drive alternating current generators in parallel, and it is not generally known that a great deal can be accomplished by a proper selection of the crank angle.

Prof. Chamberlain, Lewis Institute, described some experiments to determine the angular variation of a fly-wheel. The fly-wheel was coated with whitewash, so that a pointed spring bearing against it would make a record. The point of the spring was placed eccentric with a shaft on which a motor was mounted. If the fly-wheel was at rest the spring would describe a circle, but if in motion there would be recorded a series of loops. This apparatus was so mounted that it could be moved along the face of the wheel, preventing one series of workings from becoming confused with the next. Any variation was supposed to show in the length of the loops. This apparatus was criticised as not being sufficiently accurate.

TECHNICAL.

Manufacturing and Business.

The Sterlingworth brake-beam has been specified for 2,750 cars recently ordered by the Southern Railway and 1,500 cars ordered by the Wabash.

The Bettendorf bolster has been specified, through the agency of Milner & Caleb, for 300 cars of 80,000 lbs. capacity ordered from the Illinois Car & Equipment Co.

The Railroad Supply Co. of Chicago has acquired a line of patents for signals and highway crossing alarms issued to Slayter & Barnes. The various signals covered by these patents will be made and sold by the Railroad Supply Co.

The J. H. Day Co. mentioned in our issue of May 24 in connection with the Kincaid Locomotive Stoker have purchased the plant of the Cincinnati Radial Drill Co., and will use the entire plant in the manufacture of the "Kincaid Locomotive Stoker." A company will be incorporated, and the business will be conducted hereafter under the name of the Day, Kincaid Stoker Co.

Iron and Steel.

Charles N. Boulden has resigned as Secretary and Treasurer of the Structural Iron & Steel Co., Baltimore.

Papers were filed June 4 under the New Jersey laws for the Cuyahoga Steel & Wire Co., with a capital of $500,000. The incorporators are: C. V. Childs, James R. Mapletoft and H. N. Smith.

The London offices of the various companies constituting the United States Steel Corporation have been consolidated and placed under the management of Colonel Willard Hunsicker, of the Carnegie Steel Co.

Wallace H. Rowe, until recently Manager of the Pittsburgh district of the American Steel & Wire Co., is organizing the Pittsburgh Steel Company, to take over the business of the Pittsburgh Steel Hoop Co., now operating a plant at Monessen, Pa. The company is capitalized at $2,000,000.

Joseph E. Schwab, General Superintendent of the steel works and furnaces of the Carnegie Steel Company at Duquesne, has resigned to accept the position as Assistant to the President of the United States Steel Corporation, his brother. Mr. Schwab will go to New York about June 15. Azor R. Hunt, Superintendent of the plate mills at the Homestead Works, succeeds Mr. Schwab.

Iron Age says that the rail makers have accepted orders during the current fiscal year aggregating 2,600,000 tons, exclusive of seconds, being by far the greatest year in the trade. This total represents all the orders booked for delivery during the year beginning Oct. 1, 1900. A large part of this tonnage has been delivered, but the mills will be forced to keep running at top speed to fill their orders, if in fact they are at all able to do so.

The Colonial Steel Co. has been incorporated in Pennsylvania with a capital of $1,000,000. The incorporators are: James W. Brown, George A. Howe, T. Howe Childs, Charles M. Brown and Louis Hayes. The first three formerly composed the firm of Howe, Brown & Co., Limited, crucible steel makers of Pittsburgh, taken over by the Crucible Steel Co. of America. The Colonial Steel Co. has bought a site of about 50 acres of land at South Monaca, 27 miles from Pittsburgh, on the line of the Pittsburgh & Lake Erie Railroad. It is intended to build a large open hearth and crucible steel plant to make steel early in 1901. None of the contracts for the new plant have yet been placed. Engineers are making plans and specifications.

New York Rapid Transit.

The resolution providing for an extension of the Rapid Transit Railroad from its southern terminus at the Post Office, Manhattan, south on Broadway and under the East River to Brooklyn, was signed by Mayor Van Wyck last Saturday. This extension, which is estimated to cost about $8,000,000, was briefly outlined in the *Railroad Gazette* May 24, p. 354. A series of borings in the bed of the East River will be begun at once by the engineers of the Rapid Transit Commission to determine exactly what the conditions are for building the tunnel to Brooklyn, and also to select the best route across the river.

East River Bridge No. 4.

In our advertising columns appears a proposal for bids for the piers of the fourth bridge across the East River between New York and Brooklyn, which for the present is known as Bridge No. 4. This is the bridge which will cross at Blackwell's Island. There are to be six piers, the depth of the foundations varying from 29 ft. below mean high water to 30 ft. above mean high water, and the heights of the piers will vary from 96 ft. to 125 ft. above mean high water. The contract will cover about 300,000 lbs. of steel, 12,200 cu. yds. of earth excavation and 2,440 cu. yds. of rock excavation. The masonry will aggregate about 53,000 cu. yds. The time allowed for the building of these piers will be 500 working days.

Rails for New South Wales.

The Government of the state of New South Wales is asking for bids for 100,000 tons of steel rails to be made and finished in that state and delivered at the rate of 25,000 tons a year at a price not to exceed at the time of delivery the lowest selling price of Great Britain or America. These bids will be received by the Minister for Public Works at Sydney, New South Wales, or by the Agent General for New South Wales, at 9 Victoria street, Westminster, London, S. W., up to 2 o'clock on Wednesday, July 31. The reader is probably aware that this scheme for establishing the manufacture of rails in New South Wales has been repeatedly tried within recent years, but nobody has yet been able to see a way to establish rail mills in that country.

Bids for a Power Canal.

Proposals will be received by the Chief Engineer of the Lake Superior Power Company, Sault Ste. Marie, Ont., until noon, July 1, for building a power canal, 2,500 ft. long, 150 ft. wide and 30 ft. deep, to be excavated through sandstone ledge. A. S. Crane, Chief Engineer.

American Locomotive Co.

The Dickson Locomotive Works have been acquired by the American Locomotive Co. The details will probably be arranged within a week.

"Central-Atlantic" Locomotives for the Michigan Central.

Two heavy passenger locomotives, which are practically duplicates of the Class I "Central-Atlantic" type of the New York Central, described in the *Railroad Gazette*, Feb. 1, have been put in service on the Michigan Central between Windsor and St. Thomas, Canada. They were built by the Schenectady Locomotive Works, and two more locomotives of the same class will soon be finished and delivered. The cylinders of these engines are 21 x 26 in., the weight on drivers 95,000 lbs., and the total weight of engine in working order is 176,000 lbs., with a traction increasing device to shift about 10,000 lbs. from the engine truck and trailing wheels onto the driving wheels in the same manner as described in connection with the New York Central Class I engine. The grate area, fire-box dimensions, size of the boiler and also the apportionment and amount of heating surface are in accord with the design of the New York Central engines. The driving wheels are 79 in. in diam., and this, it is said, makes them 9 in. larger than any other driving wheels on the Michigan Central, the engines being accounted the largest in passenger service in Canada.

THE SCRAP HEAP.

Notes.

A number of freight agents of the Southern Railway are to make an extensive tour of Western cities to study methods of handling freight.

The Philadelphia & Reading has given annual passes to the passenger conductors and enginemen of the road who have served the company five years or more. Each pass is good for the employee and his wife.

In Cleveland last week a man named G. A. Myers was fined $25 and imprisoned for two months for manipulating railroad transportation. The prisoner made admissions showing that he had secured passes on many roads, and had extended them and sold them, making a living in this way.

The Michigan Central announces a new through night train between Chicago and Buffalo. The Lake Shore & Michigan Southern has put on two new trains each way, the east-bound trains starting from Chicago at 3 p. m. and 8:30 p. m. The Lake Shore, in conjunction with the Pittsburgh & Lake Erie, now runs a through train daily between Pittsburgh and Chicago.

The Railroad Commissioners of Kansas have been notified by the Missouri Pacific that the road will put in telephones at side tracks along its lines where farmers load freight but where there is no station agent. The key to the box containing this telephone will be kept at the nearest dwelling house, and the purpose of putting in the connection is to enable shippers to communicate with the agent at the nearest station.

All of the employees' brotherhoods on the Canadian Pacific are protesting against a new code of rules recently adopted by that road, and have sent a complaint to the Privy Council. Objection is made to the stipulation that an employee assumes the risks of his employment; also to that requiring a notice of 14 days before quitting, and the one giving the road the right to deduct fines for neglect of duty; also the rules making the General Superintendent the final officer to appeal to, threatening dismissal for visiting places where liquor is sold, and forbidding employees engaging in any business or trade without permission.

Traffic Notes.

The Erie has joined the interchangeable mileage ticket agreement of the Central Passenger Association, and the interchangeable books are now accepted on the lines of the Erie west of Buffalo and Salamanca.

According to the *Winnipeg Telegram* the Government of Manitoba announces that on the lines of the Northern Pacific in that province, which have been taken over by the Government, freight rates are to be at once reduced about 7½ per cent.

The Railroad Commission of Georgia in the matter of a complaint made by the Tifton, Thomasville & Gulf has decided that the Georgia Northern must receive freight from the T. T. & G. at Moultrie without requiring prepayment and without discrimination; must receive on the same terms that freight is received from the Plant lines at Pidcock.

The New York Central has opened a new freight station at Pier 5, East River, New York city. This station will be devoted wholly to flour traffic. The new pier is 560 ft. long and 80 ft. wide. The space allotted to offices, which is in the second story, is 70 ft. x 70 ft. Flour will be taken to the pier wholly by barges, no car-floats being run to this station.

Western papers report that the Atchison, Topeka & Santa Fe will establish at Kansas City an employment agency for the benefit of the farmers along its lines in Kansas. Station agents are instructed to find out how much help the farmers want. Last year the road attempted to help the farmers by making low fares from the East, but this resulted in the flooding of many towns with undesirable men, who, for some reason, did not go to work.

Forged Canadian Pacific Employees' Certificates.

Mr. Thomas Tait, Manager of Transportation of the Canadian Pacific, informs us that blank certificates of service, form 1648, from that company, are being used by men desirous of obtaining employment with other railroads, the names of the officials being forged. One of these was recently presented to the Florence & Cripple Creek, and the person presenting it stated that he obtained it in Pueblo, Colo.

LOCOMOTIVE BUILDING.

The Rogers Locomotive Works are building two engines for export.

The Erie has asked bids on 10 locomotives, with an option on 10 additional.

The Bush Co., Ltd., is having one engine built by the Baldwin Locomotive Works.

The Choctaw & Northern is having three engines built by the Baldwin Locomotive Works.

The Alabama & Vicksburg is having two engines built by the Baldwin Locomotive Works.

The Columbia & Puget Sound is having one engine built by the Baldwin Locomotive Works.

The New Zealand Government Railways are having 13 engines built by the Baldwin Locomotive Works.

The San Pedro, Los Angeles & Salt Lake is having three engines built by the Brooks Locomotive Works.

The Mississippi River & Bonne Terre is having three engines built by the Richmond Locomotive Works.

The Grand Trunk will build four 10-wheel passenger engines in addition to 22 locomotives now under construction.

The Lehigh Valley has ordered 17 more locomotives from the Baldwin Locomotive Works to be duplicates of those now building.

The St. Louis & San Francisco is reported to have increased its order with the Dickson Locomotive Works, by five locomotives.

The New York Central & Hudson River has placed an order with the American Locomotive Co. for 52 engines, to be turned out at the rate of one a week.

The Delaware, Lackawanna & Western has ordered 10 eight-wheel passenger and 30 consolidation engines from the Schenectady Locomotive Works, and 20 six-wheel switching engines with Wootten fire-boxes from the Dickson Locomotive Works.

The New York, Ontario & Western, as noted in this column recently, is having four engines built by the Cooke Locomotive & Machine Co. They are to be exact duplicates of the last 100-ton consolidation engines built for this road by the Cooke Co.

CAR BUILDING.

J. N. Knapp is having 10 freight cars built by the Erie Car Works.

H. E. Harris is having four freight cars built by the Erie Car Works.

The Southern Pacific has ordered 15 chair cars from the Pullman Co.

The Pennsylvania has placed an order with the Pressed Steel Car Co. for 2,000 cars.

The Bessemer & Lake Erie is having 10 freight cars built by the Erie Car Works.

The Iroquois Iron Works are having four freight cars built by the Erie Car Works.

The Canadian Pacific will build 100 box cars of 60,000 lbs. capacity at its Perth shops.

The Hammond Iron Works are having seven freight cars built by the Erie Car Works.

The Vicksburg, Shreveport & Pacific has ordered one cafe car from the American Car & Foundry Co.

The General Electric Company is having three freight cars built by the American Car & Foundry Co.

The St. Louis, Troy & Eastern is having 200 freight cars built by the American Car & Foundry Co.

The Algoma Central, it is reported, has ordered 50 hopper ore cars from the Pressed Steel Car Co.

The San Pedro, Los Angeles & Salt Lake has ordered 50 box cars and 100 flat cars from the Pullman Co.

The New York Central & Hudson River has ordered 1,000 box cars of 60,000 lbs. capacity from the Pullman Company.

The St. Louis Southwestern has ordered 1,000 box cars of 60,000 lbs. capacity from the American Car & Foundry Co.

The New York, Ontario & Western has ordered one standard single track snow plow, size No. 1, from W. E. Wilder, of Boston.

S. Pearson & Son are having 10 freight cars built by the American Car & Foundry Co. This is in addition to the cars recently noted.

The Minneapolis & St. Louis has ordered one combination mail, baggage and express car from the American Car & Foundry Co.

The Mexican Central has ordered from the American Car & Foundry Co. 100 box cars of 60,000 lbs. capacity and 50 double-deck stock cars.

The Southern Pacific order for Rodger ballast cars was incorrectly noted in our issue of May 31. The item should have read to the effect that the road has placed an additional order for 100 standard Rodger ballast cars and one standard Rodger ballast distributing car.

The Grand Trunk is building, in its Montreal shops, 200 wooden box cars and 300 wooden furniture cars, all of 60,000 lbs. capacity; also 10 passenger coaches and several cafe and combination cars. The box cars weigh about 33,000 lbs., and will be 35 ft. long over end sills, 9 ft. wide over side sills, 7 ft. 3 in. high inside and 12 ft. 9 in. high above the rail. The furniture cars will weigh 35,000 lbs., will be 42 ft. 7½ in long over end sills, 9 ft. 3¼ in. wide over side sills, 8 ft. 7 in. from the floor to carlines, and 12 ft. 6 in. high above the rails. The special equipment of the freight cars includes: Westinghouse air-brakes, Dunham Doors, Hutchins roofs and springs, made by the Canada Switch & Spring Co. The rest of the special equipment will be made by the road. The special equipment of the passenger cars, not made by the Grand Trunk, includes: Sterlingworth brake-beams, Westinghouse air-brakes, Gould couplers, Forsythe curtains and curtain fixtures, Standard steel platforms and Canada Switch & Signal Company's springs. The cars will be heated by the direct system of steam heat and will be lighted by Pintsch gas and electricity.

BRIDGE BUILDING.

ANDERSON, IND.—Bids are wanted, June 17, for four bridges; also for repairs to three. O. P. Crim, County Auditor.

ARCATA, CAL.—The Supervisors of Humboldt County have authorized the Surveyor to make plans and specifications for a bridge over Mad River at Arcata. Bids will be opened July 8 at Eureka.

BALTIMORE, MD.—The County Commissioners are petitioned to build two new bridges in the Eighth District, one at Gough's Chapel, and one on the Oregon road, leading from Oregon to the Western Run turnpike. A bridge is also asked for on a road leading from the York road to the Falls road, near Texas.

BARTOW, FLA.—The city is considering building a bridge over McKinney Branch.

BOSTON, MASS.—Wm. Jackson, City Engineer, submitted to the Aldermen an estimate of cost of rebuilding Federal street bridge in line with extension of Dorchester avenue, at $422,000.

GRENADA, MISS.—The county will issue $30,000 bonds for a bridge over Yalobusha River.

BINGHAMTON, N. Y.—The city officers are considering building a wagon bridge at Exchange street to replace the foot bridge.

BILBAO, SPAIN.—Bids are invited for a bridge over the River Bilbao, Bilbao, Spain. Apply to the corporation of that city before July 18.

BOISE, IDAHO.—At a special election it was voted to issue $14,700 of bonds for a bridge over the Boise River at Government Island.

BUFFALO, N. Y.—The bridge proposed over the Clark & Skinner Canal at Ohio street, for which $25,000 has been appropriated, will be a riveted girder structure about 64 ft. long and about 54 ft. wide. The plans will be made by the State Engineer on request of the Superintendent of Public Works, who will advertise for bids when the plans are finished.

The bridge proposed over Black Rock Harbor at Ferry street, Buffalo, will be a plate girder swing bridge about 130 ft. long. The plans will be made by the State Engineer on request of the Superintendent of Public Works, who will then advertise for bids. The appropriation is $30,000. (May 17, p. 340.)

BROCKTON, MASS.—It is estimated by the City Engineer that it will cost $16,000 to build the proposed Ames street bridge.

CANTON, OHIO.—The County Commissioners have approved plans for a stone arch bridge over Minishillen Creek on the new Berlin and Canton road. The electric railroad will pay part of the cost.

CLEVELAND, OHIO.—It is decided to build new bridges at Middle Seneca and Jefferson streets.

DASPIT, LA.—A bridge will be built across Bayou Queue de Tortue at Daspit. For information address J. N. Williams, Clerk of Police Jury at Abbeville, La.

DELPHOS, OHIO.—George F. Feitz, County Auditor, informs us that a new bridge will not be built over the Miami Canal at Third street at present, but the structure will be repaired to last two or three years. When the new bridge is considered it will probably be a lift bridge.

HARVARD, ILL.—An iron bridge is proposed over Kishwaukee River at about $2,500.

HOLYOKE, MASS.—Bids will be opened, June 7, for the bridge over the second-level canal. It will have four spans, each 34 ft. x 50 ft. wide. Michael F. Walsh, Chairman Board of Public Works. (May 10, p. 321.)

HOUGHTON, MICH.—Plans have been approved by the Railroad Commissioner of Michigan for an overhead bridge at crossing of the Houghton County Street Ry. with the tracks of the Hecla & Torch Lake R. R., near Houghton. The bridge to be 22 ft. above the railroad tracks.

HULTON, PA.—A company is reported organized to bridge the Allegheny River, at Hulton station, on the Pennsylvania R. R. Geo. B. Kennedy is interested.

INDIANAPOLIS, IND.—As soon as the plans for a new bridge over White River, at West Washington street, are completed, the matter will be presented to the council. The plans are for a stone bridge, of the same style as those across Fall Creek at Illinois and Meridian streets, except that the new bridge will be of stone throughout. Plans for long and short arches are being prepared. The former will cost about $145,000. Plans for a new bridge at River street are being prepared also.

The County Commissioners want bids, June 13, for a bridge over Fishback Creek, near Traders Point. Harry B. Smith, County Auditor.

ISHPEMING, MICH.—The Commissioner of Railroads of Michigan has refused to approve grade crossings of the Negaunee & Ishpeming Street Ry. with the tracks of the Duluth, South Shore & Atlantic, the Chicago & Northwestern and the Lake Superior & Ishpeming and Winthrop Junction, requiring the street railroad company if it crosses to make the crossing by means of an overhead bridge.

JENKINTOWN, PA.—It is reported that the Reading will build a bridge over Greenwood avenue.

KALAMAZOO, MICH.—Two arch bridges will be built in Olcott street, one in Bryant street and one in West Lovell street. New bridges will be required for opening East Dutton and Grace streets. The work will probably be done this year.

LAMPASAS, TEXAS.—Estimates are wanted, according to report, by the Commissioners' Court for two iron or steel bridges over Colorado River, each less than 250 ft. Address W. H. Webber. (March 22, p. 208.)

LANSING, MICH.—Plans have been approved by the Commissioner of Railroads of Michigan for an overhead crossing of the Lansing, St. Johns & St. Louis Electric Ry. over the tracks of the Pere Marquette R. R., on Center street in North Lansing.

LISTOWELL, ONT.—The Town Council has decided not to build a new bridge, but to repair the old structure.

MONTREAL, QUEBEC.—It is said the contract will be let this week for the steel bridge over the River des Prairies for the Chateaguay & Northern Ry. It will be about 4,708 ft. long. J. P. Mullarkey, Temple Building.

LOWELL, MASS.—The Board of Alderman has voted to repair the Pawtucket bridge. (May 24, p. 355.)

NELSON, ILL.—A bridge over Rock River at a cost of $30,000 is under consideration.

NEW BERLIN, OHIO.—Proposals, with plans, etc., are wanted by the County Commissioners for a stone arch bridge over Nimishillen Creek.

NEW YORK, N. Y.—Bids are wanted, by John L. Shea, Commissioner of Bridges, until June 20, for furnishing all material and building six piers for the bridge over Blackwell's Island, known as Bridge No. 4, as mentioned in our advertising columns. A description of this bridge was given in the *Railroad Gazette*, March 29.

NORRISTOWN, PA.—The Schuylkill Valley Traction Co. has agreed to build a bridge over the tracks of the Pennsylvania R. R. at the Y.

PAULDING, OHIO.—Bids are wanted, June 7, for five bridges, from 100 to 304 ft. long, by Allen Bybee, County Auditor.

QUINCY, CAL.—Bids are wanted, until July 1, by the County Clerk of Plumas County for a steel bridge over Indian Creek near Taylorville. H. C. Flourney, Clerk.

RAHWAY, N. J.—The Board of Freeholders has adopted a resolution and appointed a committee to consider the advisability of widening the Jaques avenue bridge.

ROCHESTER, N. Y.—We are told that the State Superintendent of Public Works will doubtless soon ask the State Engineer to make plans for a riveted girder lift bridge to be built over the Erie Canal at Plymouth avenue, Rochester. The appropriation is $50,000 and the bridge will be about 90 ft. long, have a roadway about 40 ft. wide and two walks each 10 ft. wide. When the plans are made, the Superintendent of Public Works will ask for bids.

RUSTON, LA.—The Hamburg, Ruston & Southern will need two drawbridges on the proposed line—one over D'Arbonne in Union Parish about 200 ft., and the other over the Ouachita River near the Arkansas state line. (See Railroad Construction column.)

SCRANTON, PA.—Sealed bids will be received by the County Commissioners of Lackawanna County at the courthouse until June 15 for 13 stone arches, four steel girder and corrugated iron stone covered bridges. Bids will also be received for some other work. W. G. Daniels, Chief Clerk.

TERRE HAUTE, IND.—The County Council has authorized a new bridge built over the Wabash to replace the present structure at a cost of about $40,000. The proposed structure will be about 600 ft. long.

TOLEDO, OHIO.—It is reported that the Council Committee on Harbors, etc., has ordered bids be asked for repairing Lafayette street bridge. Cost, $6,400.

TRENTON, N. J.—Plans have been submitted to the Secretary of War by the Pennsylvania R. R. for a bridge over the Delaware River. The new structure will be a four-track, stone arch bridge located about 1,000 ft. below the old bridge.

URBANA, ILL.—On June 13, at 1 p. m., the contract will be awarded for two highway bridges of about 60 ft. span upon stone masonry. Specifications may be had of Ira O. Baker, Champaign, Ill.

WAREHAM, MASS.—The New Bedford & Onset Street Ry. proposes to build a bridge over the Waukinco pond in Wareham and has plans before the Harbor & Land Commissioners for approval.

WETUMPKA, ALA.—Permission is asked to build a toll bridge across the Tallapoosa River at Wetumpka by Wm. Chislom, Julius Knabe, John W. Watts, H. Rosenberg, of Montgomery.

WHITECLIFFS, ARK.—The Kansas City Southern Ry. will bridge Little River near this place.

WILMINGTON, DEL.—The Street & Sewer Department has asked the Baltimore & Ohio to build a bridge over the tracks at Lovering avenue.

Other Structures.

ATLANTA, GA.—Plans for a union station to be built for the Southern Ry., the Atlanta & West Point and the Central of Georgia are reported finished.

BINGHAMTON, N. Y.—The city has offered free a 20-acre plot to the Delaware, Lackawanna & Western for a location of its shops in this city. The company has been contemplating removing the shops from Scranton and Utica and is reported considering locating them in Binghamton.

BUFFALO, N. Y.—The New York Car Wheel Works has filed plans with the Bureau of Building for a foundry building to replace the one destroyed by fire last fall. The building is to be located on the south side of Forest avenue and the Erie Canal. It will be 135 x 192 ft. and one-story high. The estimated cost is $25,000.

EL PASO, TEXAS.—A company is reported organized to build a union depot in El Paso. B. F. Hammett, Jr., and J. A. Eddy, as trustees of the terminal company, have applied for a charter.

EVERETT, WASH.—C. F. Groenke, formerly of Merrill, Wis., will build an iron foundry and machine shops in Everett. H. Walther, of Everett, is reported interested.

HUDSON, WIS.—The repair shop of the Chicago, St. Paul, Minneapolis & Omaha was burned on June 2, causing a loss of about $50,000.

MANILA, PHILIPPINES.—The Navy Department is about to ask for bids for a coaling depot at Sangley Point, Manila Bay, to be one of the most extensive of its kind owned by the Navy, and to have a capacity for 45,000 tons of coal. There will be extensive docks and elaborate coal handling equipment for coaling warships.

MUNCIE, IND.—Specifications for the new union station for the Lake Erie & Western and the Big Four are finished and provide for a brick and stone building to cost about $30,000.

PUEBLO, COLO.—It is reported that the Santa Fe will begin work at once on the planned improvements on the roundhouse. About $21,000 will be spent in doubling the present capacity, which is 12 stalls. Additional coal bins and sand sheds will be built.

ROANOKE, VA.—The Norfolk & Western has contracted with John P. Pettyjohn, of Lynchburg, Va., to enlarge their shops in Roanoke. The cost will be $150,000. The

additions will be machine shops, 72 x 201 ft.; blacksmith shop, 28 x 99 ft.; boiler shop, 50 x 65 ft.; tool shop, 35 x 75 ft. The buildings will be of brick and steel.

SUSQUEHANNA, PA.—It is reported that the Erie R. R. contemplates building shops at this place.

SEATTLE, WASH.—A machine shop will be built on Railroad avenue near Washington street, by John T. Heffernan, President of the Heffernan Iron Works.

TACOMA, WASH.—The Northern Pacific will extend its shops at South Tacoma.

WABASH, IND.—President Ingalls, of the Big Four, is reported as saying that the new passenger station and division headquarters will be built in Wabash this summer. Plans are reported approved. The new building will cost about $20,000.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad associations and engineering societies see advertising page xvii.)

American Society of Civil Engineers.

A regular business meeting was held at the Society House on Wednesday at 8:30 p. m. Morris Knowles, Assoc. M. Am. Soc. C. E., presented and illustrated with lantern slides a paper prepared by himself and Mr. Charles G. Hyde, entitled, "The Lawrence (Mass.) City Filter; a History of Its Installation and Maintenance."

Accounting Officers.

The sixteenth annual meeting of the Association of American Railway Accounting Officers was held at Denver May 29. Mr. H. C. Whitehead, General Auditor of the Atchison, Topeka & Santa Fe, was chosen President for the ensuing year. The Secretary is C. G. Phillips, 79 Dearborn street, Chicago. The meeting next year will be held at Philadelphia.

International Association for Testing Materials.

The fourth annual meeting of the American Section will be held at Niagara Falls, N. Y., on Saturday, June 29, 1901, the day after the close of the convention of the American Society of Civil Engineers. The headquarters will be at the International Hotel, where the sessions will also be held. There will be three sessions, and the preliminary programme includes the report of the Executive Committee regarding the congress at Buda-Pesth, in September, 1901; report of committee No. 1; discussion of the specifications recommended for structural steel for buildings, structural steel for bridges and ships and open-hearth boiler plate and rivet steel; discussion of the specifications recommended for steel rails and steel splice bars; discussion of the specifications recommended for steel axles, steel tires and steel forgings; discussion of the specifications recommended for steel castings and wrought iron; reports of other technical committees on iron and steel; reports of the technical committees on cements, and reports of other committees on materials.

Society of Naval Architects and Marine Engineers.

It will be remembered that Lieut. Bowles, Secretary and Treasurer of this Society, was lately advanced to the rank of Chief Constructor of the Navy, giving him also the rank of Rear Admiral. Owing to his new duties he has resigned as Secretary and Treasurer, and that place has been filled by the election of Naval Constructor W. L. Capps. The Secretary's office is 12 West 31st street, as heretofore.

The ninth annual meeting of the Society will be held in New York next November, and it is proposed to have all papers in print 30 days before the meeting, so that they may be distributed in advance for discussion. A member of the Council has offered a prize of $100 for the best paper upon the subject of "The Theoretical and Practical Methods for Balancing Marine Engines." Papers submitted in competition for this prize must be sent to the Secretary before Oct. 1, and should be plainly addressed and marked in one corner "For Prize Competition," and underneath the motto or other distinguishing title of the sender. In a sealed envelope similarly addressed, should be enclosed the name of the sender and his motto or distinguishing title.

Engineers' Club of St. Louis.

The 527th meeting was held at 1600 Locust street, May 15, President Spencer presiding; present, 26 members and six visitors. The paper of the evening was entitled "The Coal Supply of St. Louis and Adjacent Territory," by Mr. Duncan F. Cameron, Superintendent of Mines for Donk Bros. Coal & Coke Co. Mr. Cameron took up in a general way the extent of coal territory tributary to St. Louis, giving areas of these coal measures, also their total annual production and the consumption of bituminous coal by the city of St. Louis. He then discussed in detail what had been done in the way of washing coal at the mines, the result of which is the elimination of the slate and iron pyrites. The construction of a modern coal washing plant was explained, the same being illustrated on the screen. Mr. Cameron stated tests have been made in office building steam plants in St. Louis and at other places showing a saving of 20 per cent. to 28 per cent. of fuel bills by using washed coal instead of unwashed coal. It was also stated that a very fair quality of coke had been made from washed Illinois coal, in ovens which were not altogether of modern type. Experiments, the object of which are to produce a good foundry coke from Illinois coal, are being continued with considerable promise of success.

The next meeting, which will be the last one before the summer recess, will be held June 5 at 8 p. m. The subject of the evening will be a paper by Mr. A. H. Blaisdell, entitled, "Western River Steamboat Construction." Mr. Blaisdell will exhibit about 50 lantern slides prepared by himself from photographs of boats and drawings; will detail some tests of steamboat performances, illustrate the path of the paddle wheel and its slip, give examples of speed calculations and outline the method of designing a steel hull, with calculations of stability, strength, etc.

PERSONAL.

(For other personal mention see Elections and Appointments.)

—Mr. W. S. Speirs, late Commissioner of the Southwestern Traffic Association at St. Louis, died at his home in Chicago, May 29, having been in railroad service about 35 years. He began in a subordinate position with the Illinois River Packet Company in 1866. Mr. Speirs was 59 years old.

—Mr. H. P. Baldwin, General Passenger Agent of the Central Railroad of New Jersey, died at his home at Roselle, N. J., May 28. Mr. Baldwin was born at Orange in 1828, and was nearly 73 years old at the time of his death. He had held the position of General Passenger Agent of this company since 1877, with the exception of a few months in 1892, when the road was controlled by the Reading.

—Mr. Frank W. Deibert, Assistant Mechanical Superintendent of the Baltimore & Ohio, at Newark, Ohio, died recently. He was born in 1859, and after receiving a public school education entered the railroad service in 1877 as a machinist apprentice on the Indianapolis, Peru & Chicago. He then held various positions such as roundhouse foreman, General Foreman and Master Mechanic, becoming Assistant Mechanical Superintendent of the Baltimore & Ohio Feb. 1, 1900.

—Mr. George W. Dowe, recently appointed Superintendent of the New York, Susquehanna & Western, is a native of New Hampshire, having been born at Concord, Feb. 26, 1846. He began railroad work as a passenger conductor and passed through the various grades until 1895, when he was appointed Superintendent of the Jefferson Division of the Erie and four years later became Superintendent of the Allegheny Division, which position he held up to the time of his recent appointment.

—Mr. C. C. Jerome died, May 24, in Germany, after a brief illness. Mr. Jerome was well known among railroad men as the inventor of the metallic packing which bears his name. He was born in Canada in 1833 and studied medicine at Toronto, later practicing his profession at Port Huron, Mich., and serving during the Civil War as a surgeon. Since 1869, Mr. Jerome had made his home in Chicago. In 1880, he started the metallic packing business which, for the past five years, has been under the direct charge of his son, Mr. George C. Jerome.

—Mr. W. H. Newman, the new President of the New York Central & Hudson River, was born in Prince William County, Va., some 54 years ago. In 1869 he became station agent for the Texas & Pacific. Three years later he was made General Freight Agent of the road. In 1883 he was appointed Traffic Manager for the Southwestern system lines in Texas and Louisiana, and later held the same position for the Missouri Pacific. He soon became Third Vice-President of the company, and after that was made Third Vice-President of the Chicago & Northwestern. A more complete sketch of Mr. Newman's life appeared in our issue of April 29, 1898, page 316, at the time of his election to the Presidency of the Lake Shore & Michigan Southern.

—Mr. John S. Chambers, the new Superintendent of Motive Power of the Atlantic Coast Line, was born May 27, 1857, and began railroad work in 1886 as a machinist on the Wabash, St. Louis & Pacific. From 1889 to 1893 he was General Foreman and Master Mechanic of the St. Joseph Terminal. He then became Master Mechanic of the Illinois Central and then for one year was engaged in special work. Mr. Chambers was appointed Superintendent of Motive Power of the West Virginia Central & Pittsburgh in 1898. The following year he became Master Mechanic of the Buffalo Division of the Lehigh Valley and in July, 1899, Master Mechanic of the company from which he recently resigned, the Central of New Jersey.

—Mr. Edgar Van Etten, who has just become Second Vice-President of the New York Central & Hudson River, was, previous to 1884, Chief Train Despatcher of the Delaware Division of the New York, Lake Erie & Western, and was, from 1884 to 1887, Superintendent of the same division. In September, 1887, he became Superintendent of the Buffalo Division, and two years later Superintendent of the Western Division of the Rome, Watertown and Ogdensburg. In 1890 he was appointed Manager of the Buffalo Car Service Association, but two years later he became Superintendent of the Buffalo Division of the Lehigh Valley. In May of the same year (1892) he went back to the Rome, Watertown & Ogdensburg which had been leased by the New York Central, and the next year he became General Superintendent of the Central. It is from this position that he is now promoted. Mr. Van Etten has performed most of the duties of a General Manager for several years. His principal field of activity will continue to be in the operating department.

—Mr. Daniel B. Robinson, ex-President of the St. Louis & San Francisco, died May 31, in Chicago. Mr. Robinson was born in St. Albans, Vt., in 1847. He began his railroad career when 19 years old as a clerk on the Central Vermont. He was appointed chief clerk in the mechanical department of the Central Pacific and later was connected with the Sonora and the Mexican Central Railways as General Manager. He resigned from the Mexican Central in 1885 and in September of the same year became General Manager of the Atlantic & Pacific. He then became General Manager of the Colorado Midland. For five months Mr. Robinson was Assistant to the President of the Atlantic & Pacific, later becoming the General Manager. For one year (1892-1893) he was President of the San Antonio & Aransas Pass, then President of the Santa Fe, Prescott & Phoenix. He was First Vice-President of the Atchison, Topeka & Santa Fe for three years, and in July, 1896, became President of the St. Louis & San Francisco, from which position ill health compelled him to resign a little over a year ago.

—Mr. D. I. Roberts will retire from office as General Passenger Agent of the Erie and it is supposed that he will be succeeded by Mr. D. W. Cooke, now Assistant General Passenger Agent. Mr. Roberts is just 48 and has been in the railroad service ever since 1873. Until 1890 he was on the Pennsylvania Lines West of Pittsburgh, nearly always in the traffic department, although he had served a short time in the car service department and as a station agent. October, 1890, he became Assistant General Passenger Agent of the Erie at Chicago, and December 7, 1891, he became General Passenger Agent. We cannot help thinking that loss to the Erie, and further that if he should leave railroading, as he has some thought of doing, it would be a loss to the railroads. He is a man of great energy, original, fertile, resolute and with a high sense of honor. Furthermore, he has conservative and judicious views of the methods of developing and conducting the passenger business. With all of his enterprise, since he has been at the head of the department he has always taken what would be called the conservative side; that is, in the numerous conferences of passenger men and superior railroad officers in which he has taken part his vote and voice have been on the side of maintaining rates and always on the side of square dealing as between the railroad companies themselves and as between the railroads and the public. His zeal and personal devotion to his business have been extraordinary. During his management of the department the passenger train earnings of the Erie have increased beyond all expectations, and the quality of the service has come to be excellent. Mr. Cooke, who, it is supposed, will succeed Mr. Roberts, has enjoyed, as we well know, Mr. Roberts' confidence and respect, and we speak with confidence in saying that he would have been Mr. Roberts' first choice as his own successor.

—Elsewhere we have spoken at some length of the change in the presidency of the Baltimore & Ohio which involves several other official changes. Mr. Loree becomes President, and a sketch of his life, with a portrait, appeared in our issue of Jan. 11 last. Mr. George L. Potter becomes General Manager; a sketch of his life, with a portrait, appeared in our issue of Jan. 4. Mr. Arthur Hale becomes Assistant General Manager; something concerning his career appears elsewhere in this column. Three new staff positions are created with the title of Assistant to the General Manager. The gentlemen who are to fill these positions are Messrs. L. G. Haas, J. T. Leary and T. J. Foley. Mr. Haas is now Division Superintendent of the Erie & Ashtabula Division of the Pennsylvania Lines west of Pittsburgh, which position he took Nov. 1, 1899, having been Engineer of Maintenance of Way on that division for about two years. He was born Feb. 25, 1865, was graduated from the Ohio State University, and from June 1, 1886, has been in the service of the Pennsylvania Lines, always in the engineering department, until he became Division Superintendent. The Erie & Ashtabula Division is probably one of the most difficult to operate on the Pennsylvania Lines West.

Mr. Leary has been in the office of the General Superintendent of Motive Power at Pittsburgh for some time. He is an expert accountant, and has had much experience in studies of motive power and movement statistics.

Mr. Foley has recently been Transportation Inspector of the Pennsylvania Lines. His duty there has been to scrutinize methods in the yards and at large stations. His earlier experience was as Train Despatcher. His recent experience has been of a highly specialized character, dealing with the movement and handling of cars and trains, and it is easy to imagine what the special line of work of these three assistants, Mr. Haas, Mr. Leary and Mr. Foley, will be.

—Mr. Arthur Hale, the new Assistant General Manager of the Baltimore & Ohio, has been in the employ of the Pennsylvania for 19 years, having served in the mechanical and transportation departments, chiefly the latter, before he became Superintendent of Telegraph. Mr. Hale is the son of the Rev. Dr. Edward Everett Hale, and was born in 1859. He graduated from Harvard University in 1880, and went to Altoona two years later as apprentice, later becoming draughtsman in the motive power department. In 1885 he went to Philadelphia, and for four years, ending 1894, was chief clerk of the car record office. Then for five years he did special work in the department of the Superintendent of Transportation, and finally in 1898 became Superintendent of Telegraph, a new office, and the organization of this department has been Mr. Hale's work. He has an able and original mind which has been highly trained, and he has great capacity for work. Together with Mr. R. W. Patterson, now Superintendent of the New York Division of the Pennsylvania Railroad, he made the investigations and did the field work that preceded the new arrangements and methods for handling traffic which were inaugurated by Mr. Prevost when he became General Superintendent of Transportation and later General Manager of the Pennsylvania Railroad. In Mr. Hale's service in the transportation department, and later as Superintendent of Telegraph, he has made himself acquainted with a broad range of details, and we can well imagine that he will be a valuable aid to Mr. Loree and Mr. Potter.

ELECTIONS AND APPOINTMENTS.

Atlantic Coast Line.—J. S. Chambers, heretofore Master Mechanic of the Central of New Jersey, at Elizabethport, N. J., has been appointed Superintendent of Motive Power of the A. C. L., with headquarters at Wilmington, N. C., effective June 10. Mr. Chambers succeeds T. H. Symington, resigned.

Atchison, Topeka & Santa Fe.—At a meeting, held June 5, the position of Chairman of the Executive Committee was created and Victor Morawetz was elected to this position. At the same meeting J. W. Kendrick, heretofore Second Vice-President of the Northern Pacific, was elected Third Vice-President of the A., T. & S. F., succeeding J. M. Barr, resigned. Mr. Kendrick will assume his new duties immediately.

Baltimore & Ohio.—L. F. Loree, heretofore Fourth Vice-President of the Pennsylvania Company, has been elected President of the B. & O., and G. L. Potter, also of the Pennsylvania Company, has been appointed General Manager of the B. & O. Arthur Hale, heretofore Superintendent of Telegraph of the Pennsylvania, has been appointed Assistant General Manager of the B. & O. Three new positions, with the title of Assistant to the General Manager, have been created and L. G. Haas, J. T. Leary and T. J. Foley have been appointed to these positions. Mr. Haas was formerly Superintendent of the Erie & Ashtabula Division (Northwest System) of the Pennsylvania Company.

Blackwell, Enid & Southwestern.—The officers of this company are: President, Breckinridge Jones; Vice-President, Harrison I. Drummond; Superintendent, Linton Williams, and Chief Engineer, F. G. Jonah. Mr. Jonah is in charge of the survey and construction of an extension of 125 miles. (See R. R. Construction column, May 31, p. 373.)

Canadian Pacific.—C. R. Ord, Master Mechanic at Winnipeg, Man., has been transferred as Master Mechanic to McAdam, N. B

Central of New Jersey.—C. M. Burt has been appointed General Passenger Agent, succeeding H. P. Baldwin, deceased.

Chicago Great Western.—L. F. Wakefield has been appointed Engineer of Construction.

Chicago, Rock Island & Pacific.—R. W. Day, heretofore Division Engineer of the Lines East of the Missouri River, has been appointed Assistant Chief Engineer. Marvin H. Dey becomes Division Engineer of the Illi-

nois Division, and L. B. Holt, Acting Division Engineer of the lines in Iowa and Missouri, effective June 1.

Chicago Terminal Transfer.—C. W. Tait has been appointed Master Mechanic, succeeding A. Brown, effective June 1.

Davenport, Rock Island & Northwestern.—E. E. Hughes, General Manager, has resigned. (See Ozark & Cherokee Central.)

Detroit, Howell & Lansing (Electric).—The officers of this company, referred to in the Construction column, are: President, John Winter; Vice-President and Secretary, Oliver H. Law; Treasurer, Homer Warren; Chief Engineer, L. B. Wilson, all of Detroit, Mich.

Erie.—Daniel Willard, heretofore Assistant General Manager of the Baltimore & Ohio, has been appointed Assistant to the President of the Erie, with headquarters at 21 Cortlandt street, New York City.

D. I. Roberts, General Passenger Agent, with headquarters at New York, has resigned. It is understood that D. W. Cooke, Assistant General Passenger Agent, will succeed Mr. Roberts as General Passenger Agent.

Galveston, Harrisburg & San Antonio.—G. P. Drodge has been appointed Acting Master Mechanic, with headquarters at El Paso, Texas, succeeding J. R. Garrick, resigned.

Grand Trunk.—Wm. Cotter, Superintendent of the Western Division, having resigned to accept service with another company, the following changes are effective June 1: F. W. Egan becomes Superintendent of the Western Division, with headquarters at Detroit, Mich.; G. C. Jones, Superintendent of the Middle Division, at Toronto, Ont., succeeding Mr. Egan, and Mr. Jones, in turn, is succeeded by W. G. Brownlee, as Superintendent of the Eastern Division, at Montreal, Que.

Greenwich & Johnsonville.—C. B. Vorce has been appointed Chief Engineer, with headquarters at Greenwich, N. Y.

Gulf & Ship Island.—Richard Morgan, heretofore Trainmaster, has been appointed Superintendent.

Intercolonial.—E. T. Horn, heretofore General Yardmaster of the Delaware, Lackawanna & Western, at Hoboken, N. J., has been appointed Assistant Manager of the Intercolonial, with headquarters at Moncton, N. B.

Kansas City Southern.—C. E. Perkins has been appointed Assistant General Freight Agent, succeeding M. L. Scovell. (See Texarkana & Fort Smith.)

Laramie, Hahns Peak & Pacific.—W. M. Shipman has been appointed General Manager, with headquarters at Laramie, Wyo., effective July 15. (See R. R. Construction column, May 24, p. 357.)

Lehigh & New England.—Leonard Goodwin, General Superintendent, and J. R. Whitney, General Freight and Passenger Agent, having resigned, these offices were abolished on May 31, and the position of General Manager was created. On June 1, the following appointments were made: J. R. Whitney, General Manager, to have charge of the operating and traffic departments; E. C. Young, Engineer Maintenance of Way; F. S. Fowler, Auditor, and J. J. Heintzelman, General Agent. All with headquarters at Pen Argyl, Pa.

New York Central & Hudson River.—W. H. Newman, President of the Lake Shore & Michigan Southern, has been elected President of the N. Y. C. & H. R., succeeding S. R. Callaway, resigned. E. VanEtten, heretofore General Superintendent, was elected Second Vice-President. The following appointments have been made: Vernon V. Beard, Assistant General Eastern Passenger Agent, at 1216 Broadway, New York City; Charles E. Buchholz, Division Engineer of the River Division, with headquarters at Weehawken, N. J., and W. S. Kallman, Chief of the Tariff Bureau of the freight department.

Ohio Southern.—W. D. Gray, heretofore General Auditor of the South Carolina & Georgia Extension, has been appointed Auditor of the O. S., succeeding H. G. Myers, resigned.

Ottawa, Northern & Western.—The name of the Ottawa & Gatineau Railway has been changed to Ottawa, Northern & Western, and George A. Savage becomes General Auditor at Montreal, Que., and George A. Lizotte, Traffic Auditor of Receipts and Disbursements, at Ottawa.

Ozark & Cherokee Central.—E. E. Hughes, heretofore General Manager of the Davenport, Rock Island & Northwestern, has been elected Vice-President and General Manager of the O. & C. C., a line now under construction.

Pecos System.—Lee Webster has been appointed Auditor and Superintendent of the Pecos River, succeeding A. A. Driggs.

Pennsylvania Company.—James J. Turner has been elected a Director, succeeding L. F. Loree.

Southern Pacific.—Thos. Garrick, heretofore Assistant Master Mechanic at Los Angeles, has been appointed Acting Master Mechanic at San Francisco, Cal., succeeding F. L. Bates, resigned. A. D'Heur has been appointed Resident Engineer of the San Joaquin Division, succeeding W. C. Ambrose, resigned.

W. S. Palmer, heretofore Assistant Division Superintendent at Oakland Pier, Cal., has been appointed Division Superintendent, with headquarters at Sacramento, Cal., succeeding J. B. Wright, resigned.

Suffolk & Carolina.—Henry Crocker, heretofore Superintendent of Transportation, has been appointed Superintendent, effective June 1. The position formerly held by Mr. Crocker has been abolished.

Texarkana & Fort Smith.—C. E. Perkins has been appointed General Freight Agent, succeeding Mr. Scovell. (See Kansas City Southern.)

Wheeling & Lake Erie.—C. Hagen, Master Car Builder, with headquarters at Ironville, Ohio, has been granted an indefinite leave of absence.

White Pass & Yukon.—A. B. Newell, heretofore Division Superintendent of the Lake Shore & Michigan Southern, has been elected Vice-President of the W. P. & Y.

Yazoo & Mississippi Valley.—C. A. Beck, having been appointed Chairman of the Board of Pensions, the position of General Purchasing Agent is abolished, and D. W. Ross has been appointed Purchasing Agent, effective June 1.

RAILROAD CONSTRUCTION.

BIRMINGHAM, SELMA & NEW ORLEANS.—The citizens of Linden, Ala., have subscribed $3,500 for extending this line into that city and a survey has been made. The road is being extended from Martin's Station west 20 miles to Thomaston. (April 19, p. 275.)

CANADIAN PACIFIC.—J. D. McArthur, of Winnipeg, Man., has the contract for building 42 miles of extension from Forest, Man., on the Great Northwest Central near Brandon, to run northwest into Daly and Woodworth townships.

CARO & LAKE HURON.—W. E. Tench & Co. have obtained the contract for building this line from Caro, Mich., to Owendale, 25 miles. An office will be opened at Caro and the work will be sublet in five-mile sections. (March 22, p. 209.)

CENTRAL OF ALABAMA.—This company has been incorporated, in Alabama, with a capital stock of $500,000, to build a railroad from Tuskaloosa to Decatur, running through Tuscaloosa, Walker and Cullman counties. John Carlisle, Room 37, Carlisle Bldg., J. T. Hill, F. J. O'Connell and A. L. McConnell, of Cincinnati, Ohio, and D. W. Sperke, T. L. Baker and Charles Bassett, of Decatur, are incorporators.

CHESAPEAKE & OHIO.—The company is reported preparing to straighten its tracks on the James River Division between Richmond, Va., and Lorraine.

CHICAGO GREAT WESTERN.—Surveys were begun this week for the extension from Sioux City to Fort Dodge, Iowa, under L. F. Wakefield. Several experimental routes must be surveyed to find one to meet the requirements laid down by President Stickney for a grade not to exceed 26 ft. per mile. (May 24, p. 357.)

The company has bought real estate in Fort Dodge for enlarging the switching yards in that city. The property is along the line of the Mason City & Fort Dodge, recently acquired.

CHOCTAW, OKLAHOMA & GULF.—A branch is proposed from Little Rock, Ark., to Malvern, 40 miles.

CLEVELAND & EASTERN ELECTRIC.—See Railroad News column.

COLORADO MIDLAND.—New 75-lb. rails are to be laid along the heavy grades on this line, according to report.

CORAOPOLIS & MONACA STREET (ELECTRIC).—This company, recently noted (May 31, p. 373), was incorporated in Pensylvania, March 26, with a capital of $75,000, to connect the cities named. The incorporators are: Henry Cooper, Bellevue; C. I. McDonald, Woodlawn; J. C. Whitla, Pittsburgh; H. T. Dempsey, Beaver Falls; H. W. Klein, Allegheny.

DAYTON, SPRINGFIELD & URBANA ELECTRIC.—See Dayton, Lebanon & Cincinnati in Railroad News column.

DELAWARE & HUDSON.—An officer writes that the company proposes building a spur from Moreau Station, N. Y., about 1½ miles south of Fort Edward to South Glens Falls, 4.8 miles, with a branch spur of about 1½ miles long reaching the mills of the Union Bag & Paper Co., at Baker's Falls. Work will probably be begun about July 1. Location surveys have been made and right of way bought. It is undecided whether the work will be done by contract or by the company's own men. The work is very light, there being only about 50,000 cu. yds. of excavation and embankment. The rail to be used will be relaying rail taken from the main line tracks. (May 31, p. 373.)

DELPHOS, VAN WERT & FORT WAYNE ELECTRIC.—This company was incorporated in Ohio, May 25, with a capital stock of $50,000, to connect the towns of Lima, Van Wert and Delphos, with an extension later to Fort Wayne, Ind.

DES MOINES INTERURBAN (ELECTRIC).—The city of Winterest, Iowa, has granted a franchise for an extension of the Des Moines line to that city on the condition that it be operated within two years from May 21 last.

DETROIT & TOLEDO SHORE LINE (ELECTRIC).—The company has filed maps showing the corrected location of its route from Trenton, Wayne County, Mich., to Vienna Station, on the Michigan Central in Monroe County. (May 3, p. 307.)

DETROIT, HOWELL & LANSING (ELECTRIC).—Surveys are just begun on this line to run from Detroit, Mich., northwest via Greenfield, Sand Hill, Farmington, New Hudson, Kensington, Brighton, Ratz, Howell, Fleming, Fowlerville, Webberville, Phelpstown, Williamstown and Okemos to Lansing. There is another route proposed between Detroit and Farmington by way of Highland Park. The Detroit Construction Co. has the contract. Warren Andrews & Co. are the New York representatives. (May 31, p. 373.) The officers are given under Elections and Appointments. (Official.)

EAST TENNESSEE & WESTERN NORTH CAROLINA.—Orders are reported issued to Superintendent J. E. Lawton to repair the line at once where it was destroyed by the Doe River.

ENTERPRISE SOUTHERN.—This company has been incorporated in Alabama, with a capital stock of $200,000, to build a railroad from Enterprise to Geneva. The incorporators are: T. D. L. Edwards, Ed M. Johnson, W. A. McGilvray, R. J. McDowell, J. A. Adams, C. M. McCurley, J. A. Rast, G. W. Carlisle, W. A. Lewis, W. D. Edwards, J. W. Harrison, W. B. Finney, J. C. Wahlen, C. W. Carmichael and R. A. Clements.

ERIE.—The Appellate Division has rendered a decision prohibiting this company from crossing the Stewart property for the Goshen cut-off at Goshen, N. Y. Building was begun some weeks ago pending the decision. (April 26, p. 292.)

ESCANABA & LAKE SUPERIOR.—Work is begun on a proposed extension of 15 miles to a large tract of timber land on the Escanaba River in Michigan. All the surveys are completed. (Construction Supplement, March 8, 1901.)

FINDLAY & MARION ELECTRIC.—This company was incorporated in Ohio, May 24, with a capital stock of $10,000, to build a line 48 miles long connecting the two cities by way of Upper Sandusky. Among the incorporators are: Ex-Lieutenant-Governor Asa W. Jones and J. H. Ruhlman, Youngstown; Judge Allen Smalley, Upper Sandusky; William E. Schofield, Marion, and P. B. Morrison, Findlay.

FINDLAY, COLUMBUS GROVE & FORT WAYNE (ELECTRIC).—The route of this proposed line is from Findlay, Ohio, west 80 miles via Benton Ridge, Pandora, Columbus Grove, Fort Jennings, Cavette, Liggitt and Dixon to Fort Wayne, Ind. The company was organized May 24. (May 24, p. 357.) J. A. Kimmell, of Findlay, is President; W. H. Beggs, Columbus Grove, Vice-President; G. W. Kisser, Ottawa, Ohio, Secretary, and Chas. E. Niles, Findlay, Treasurer. (Official.)

FLORIDA WEST COAST.—Surveys are to be begun at once, according to report, on this line in Western Florida from Tampa south about 60 miles along the coast of Tampa Bay to Braidentown. T. C. Talafero, President of the First National Bank of Tampa, is President, and Ralph C. Caples, of New York, is Vice-President and General Manager. (May 17, p. 342.)

FONDA, JOHNSTOWN & GLOVERSVILLE.—Surveys will be begun at once, according to report, for extending the electric lines to Amsterdam, N. Y.

GEORGIA ROADS (ELECTRIC).—The North Georgia Construction Co. has been organized to build a line from Gainesville to Dahlonega. A. J. Warner, of Dahlonega, is President, and W. A. Carlisle, Vice-President.

GRAND RIVER, ALLEGAN & KALAMAZOO TRACTION (ELECTRIC).—Building is to be begun at once, according to report, on this line from Grand Rapids, Mich., south about 60 miles through Carlisle, Allegan, Byron Center, Dorr, Hilliards and Hopkins to Kalamazoo. W. H. Patterson, of Kalamazoo, Mich., is the chief promoter.

GRAND TRUNK.—Double tracking is reported decided upon between Port Union and Port Hope, Ont., on the main line.

GREAT NORTHERN.—Building is to begin soon, according to report, on lining the Boulder-Wickes tunnel in Montana.

GULF, RICE BELT & NORTHERN.—This company is soon to be incorporated in Texas to build from Crowley, La., northwest 135 miles to Leesville, and thence across Eastern Texas via San Augustine, Nacogdoches to Dallas. J. C. Braden, of Chicago, and James Orr, of Champaign, Ill., are among those interested.

HALL'S FERRY & DES PERES BELT LINE.—John B. Padfield and James O. Morris, of St. Louis, Mo., are interested in this proposed line in the suburbs of that city.

HAMBURG, RUSTON & SOUTHERN.—J. D. Barksdale, of the firm of Barksdale & Barksdale, attorneys, at Ruston, La., writes that the route of this proposed line is from Ruston, La., northeast via D'Arbonne, Farmerville and Marion, La., to Hamburg, Ark., connecting with the Mississippi River, Hamburg & Western. Surveys will be begun in a few weeks, after which work will be begun at once on the road. There are two drawbridges to be built—one across D'Arbonne in Union Paris, about 200 ft., and the other across Ouachita River at or near the Arkansas state line. The grading will be exceptionally light for a hill country, and with one exception, the maximum grade will not be over 10 ft. per mile. (May 24, p. 357.)

ILLINOIS CENTRAL.—An officer writes that he has no knowledge of any line projected between Oglesby, Ill., and Peoria or Pekin. (May 31, p. 374.)

ILLINOIS SOUTHERN.—McArthur Bros., who have the contract for the Southern Missouri extension through St. Francois County, Mo., will sublet most of the grading. (May 24, p. 357.)

INDIANA, ILLINOIS & IOWA.—A proposition has been made by this company to the Merchants' & Manufacturers' Exchange, Detroit, for an extension of the line from South Bend, Ind., east to Detroit, provided reasonable support and promise of business can be offered.

INTERNATIONAL & GREAT NORTHERN.—Surveys are reported in progress for an extension from Palestine, Tex., to coal mines and salt works on Saline Creek, 7½ miles.

KINGSTON & RONDOUT VALLEY.—S. B. Coykendall, President of the Ulster & Delaware, has sold to interests of the New York, Ontario & Western that portion of the Delaware & Hudson Canal bed from Summitville, N. Y., to Kingston. It is understood that it is to be used for the Kingston & Rondout Valley line. (Construction Supplement, March 8, 1901.)

LOUISVILLE & NASHVILLE.—Preparations are reported being made to build an additional track between Shepardsville, Ky., and Lebanon Junction, about 12 miles.

MACON, DUBLIN & SAVANNAH.—This company has let a contract to W. J. Oliver & Co., of Langley, S. C., to build its proposed extension from Dublin, Ga., to Vidalia, 40 miles. (May 17, p. 342.)

MANITOULIN & NORTH SHORE.—Sealed proposals will be received up to noon, June 15, at the company's office at Sault Ste. Marie, Ont., for a section of the line from Mile Post 13 to the crossing of the Vermillion River, five miles. Plans, profile and specifications may be seen at the office of the engineer in charge at Sudbury, Ont., or with the Chief Engineer at Sault Ste. Marie. (May 10, p. 323.)

MARBLE MOUNTAIN—This company was incorporated in West Virginia, May 30, with a capital stock of $50,000, to build a line in Pocahontas County, from the mouth of Stamping Creek, on the Greenbrier Division of the Chesapeake & Ohio, to the head of the creek in the marble field. The incorporators are: E. I. Holt, George S. McNeel, J. S. McNeel, A. M. Edgar, A. R. Smith and P. S. Clark, of Academy, W. Va.

MASSILLON, WOOSTER & MANSFIELD ELECTRIC.—This company was incorporated in Ohio, May 25, with a capital stock of $10,000, to connect the cities named. F. M. Kirk, of Cleveland, and A. M. Parrish, of Wooster, are incorporators.

MEADVILLE, TITUSVILLE & CAMBRIDGE SPRINGS (ELECTRIC).—Under this title the Meadville Traction, the Saegertown Street, the Saegertown & Venango Street, the Venango & Cambridge Street, the Oak Park and the People's Incandescent Light & Power Co. have been consolidated in Pennsylvania, and building is in progress on the Titusville & Cambridge Springs line, of which 10 miles is nearly graded. The entire system will have about 60 miles of track and is to be completed this season.

MICHIGAN ROADS.—The Mohawk Mining Co. has filed a map showing the location of a private line from its stamp mill and crossing the private tracks of the Tamarack and Quincy mines near Allouez mine. These roads are operated by the Hancock & Calumet.

MISSOURI PACIFIC.—The Sedalia, Warsaw & Southwestern, extending from Sedalia, Mo., to Warsaw, 42.3 miles, is to be changed to standard gage within the next two months, according to report.

MONTGOMERY NORTHERN (ELECTRIC).—This company has been incorporated in Alabama, with a capital stock of $100,000, to build a line from Montgomery, via Wetumpka, Elmore County, and Rockford, Coosa County, to Anniston. The incorporators are: A. K. McLeod, Alexander City; J. A. Kelley, Wetumpka; C. E. Canty, Montgomery; John W. Batson, Rockford; R. O. Meek, Roanoke; J. E. Johnson, J. W. Marley, Montgomery; P. B. Puiler, Evansville, Ind.

MUNCIE, MIDDLETOWN & GREENVILLE ELECTRIC.—Right of way is reported being obtained for this line in Indiana to connect the cities named. W. L. Campbell and A. S. Miller, of Middletown, are interested.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—An officer writes that the company has run a line to Needmore, Ala., but nothing definite is determined as to building. (May 24, p. 358.)

NEW ORLEANS, NATCHEZ & ARKANSAS.—Preliminary surveys are reported completed for this proposed line from Vidalia, La., to Lake Providence, 100 miles. W. M. Fenton, of Vidalia, is Chief Engineer, and Howard Cole, of Vicksburg, Miss., is Secretary. (April 12, p. 259.)

NIPISSING & JAMES BAY.—Henry K. Wicksteed, C. E., has been placed in charge of clearing and grading on the first section of this line, of which Mackenzie & Mann have the contract. It is projected from Nipissing, Ont., north to James Bay. (Construction Supplement, March 8, 1901.)

NORFOLK & WESTERN.—Plans are reported being made for extending the double track which now runs from Roanoke, Va., to Radford, 15 miles more to Blue Ridge, and bids will be submitted soon.

NORTHERN MICHIGAN.—The Michigan Board of Railroad Crossings has approved this proposed line from Sault Ste. Marie south about 60 miles to St. Ignace. Byron Boyden and G. W. Cobb, of Chicago, Ill., are stockholders. (May 10, p. 324.)

NORWALK, ASHLAND & SOUTHERN (ELECTRIC).—Application has been made for right of way in the city of Norwalk, Ohio, for this line from Norwalk south about 34 miles via Olena, Fitchville, New London, Herford and Savannah to Ashland. The company has obtained or about 24 miles of private right of way, which includes the entire line except in the incorporated towns. C. P. Wickham is President, and J. H. Beattie, Vice-President, both of New London. (Construction Supplement, March 8, 1901.)

OHIO NORTHWESTERN (ELECTRIC).—The Fostoria (Ohio) City Council has granted a franchise to this company for its proposed line from Fostoria northwest about 20 miles, via the old Mansfield & Coldwater roadbed to Mungen, Wood County. Wm. D. Marks, of Philadelphia, is President. (April 26, p. 292.)

ONEIDA (ELECTRIC).—The Oneida Construction Co. was incorporated in New York, May 24, with a capital stock of $50,000, to build a line under the Oneida Ry. charter. It is proposed ultimately, according to report, to connect the cities of Syracuse and Utica. Under the Oneida charter, it is said, the company has the right to extend its lines to any part of the state without first securing right of way from the Railroad Commissioners. C. Loomis Allen, of Lorain, Ohio, formerly General Manager of the Syracuse Rapid Transit, is a director of the construction company and principal projector of the line. Among the towns through which the line would run are New Hartford, Sherrill, Vernon, Oneida Castle, Chittenango and Oneida.

ONEONTA, COOPERSTOWN & RICHFIELD SPRINGS.—Surveys are reported in progress for a proposed extension from Cooperstown, N. Y., along the west side of Otsego Lake to Springfield Center, and thence to Richfield Springs. (March 22, p. 210.)

OREGON SHORT LINE.—The Utah, Nevada & California has been incorporated in California as a part of the proposed extension from Uvada, Utah, southwest across Nevada towards Los Angeles. The route is from a point on the boundary of Nevada in San Bernardino or Inyo county, to a point on the Southern Pacific at or near the town of Banning, 220 miles. (April 26, p. 292.)

PARKERSBURG & MARIETTA.—Contracts will be let in 30 days, according to report, for this line running from Parkersburg, W. Va., to Marietta, Ohio, about 13 miles. Jackson & Knox, of Parkersburg, are Engineers.

PAW PAW (ELECTRIC).—Building is in progress on this line from Fairmont, W. Va., to Fairvew, 20 miles. W. E. Howley & Co. have the contract. (May 10, p. 324.)

PELLA & SOUTHWESTERN.—People of Lake Prairie Township, Iowa, have voted a 5 per cent. tax in aid of this line from Pella southwest about four miles to a point on the Wabash near Howell. Cornelius Rhynsburger, of Pella, is an incorporator. (Construction Supplement, March 8, 1901.)

PENNSYLVANIA.—The company has filed with the Trenton (N. J.) City Engineer a map showing the proposed location of its tracks through South Trenton, which includes change of grade, etc.

Sparks & Evans have been awarded the contract for the tunnel in Philadelphia between Thirty-fourth and Fortieth streets, from the junction of the New York Division to a point on the main line in the Mantua yard. (May 24, p. 358.)

PENNSYLVANIA COMPANY.—The Pittsburgh, Fort Wayne & Chicago line between Bucyrus and Upper Sandusky, Ohio, according to report, is to be double-tracked and invitations have been extended to contractors for bids to be submitted to the Chief Engineer on June 10.

PERE MARQUETTE.—Maps have been approved by the Michigan Board of Railroad Crossings for a change of location between Plymouth and Grand Blanc. This will eliminate a number of grades and materially shorten the line. (April 12, p. 260.)

Maps have also been approved showing a change of line in the city of Allegan, whereby the road runs through the city instead of into the outskirts. (Construction Supplement, March 8, 1901.)

RUTLAND.—An officer of the Quebec Southern writes that there is no intention of building a line from Iberville north to Montreal at present, as reported, though it may be undertaken some time in the future. (May 24, p. 358.)

SUNDAY CREEK RAILROAD COMPANY OF COLUMBUS.—This company was incorporated in Ohio, May 28, with a capital stock of $10,000, by officers of the Baltimore & Ohio, to build a line from the village of Sayre, Perry County, to a point in Union Township, Morgan County, near the forks of Sunday Creek, to reach a new coal mine.

SOUTHERN.—An officer writes that surveyors are making examination for a line from Clinton, Tenn., south to Loudon, on the main line, with a view to shorten the haul between the coal fields and Chattanooga, Atlanta and other points. It will be several weeks before these surveys are finished and reported to the President for action. (May 24, p. 358.)

SOUTHERN PACIFIC.—A branch is being built in the suburbs of Houston, Texas, about two miles long, to reach industries.

TAMPA BAY & EAST COAST.—W. B. Swearingen, of Bartow, Fla., is reported to have the contract for this line from Tampa to Bartow, 45 miles. R. H. Rhett, of Charleston, S. C., is President, and L. W. Haskell, of Savannah, is Secretary. (May 24, p. 358.)

TOLEDO, BOWLING GREEN & SOUTHERN TRACTION (ELECTRIC).—Contracts will be let within 30 days for this connecting line between Toledo and Findlay, Ohio. The present roads run south 35 miles to Jerry City, and from Findlay north to Mortimer. It is proposed to build from Mortimer north through North Baltimore to Trombley, connecting with the lines at Toledo. Both of the existing lines are owned by the new company. George B. Kerper, 28 North Main street, Cincinnati, Ohio, is President, and Geo. F. Smith, Findlay, General Manager. (Toledo & Southern Interurban, April 12, p. 260.)

TOLEDO, ELKHART & CHICAGO.—Surveys have been made for this line to run from Elkhart, Ind., east about 75 miles through LaGrange and Angola to Montpelier, Ohio, with a branch to run north via Wakarusa to Benton Harbor, Mich. Among those interested are H. Leone Miller, of Fairmount, Ind.; O. G. Wales, Dowagiac, Mich.; A. O. Baker, Marion, Ind., and A. R. Beardsley, Elkhart.

TOLEDO, FREMONT & NORWALK (ELECTRIC).—An offer has been made by this company to the citizens of Gibsonburg, Ohio, to build a spur from the main line three miles north of that city.

TUG & GUYANDOTTE.—Right of way is being obtained for this proposed line in West Virginia, 46 miles long, from Davy Station, on the Norfolk & Western, through McDowell County to Baileyville. C. A. Wagner, of Welch, W. Va., is Engineer. (May 10, p. 324.)

WASHINGTON & PLYMOUTH.—Arrangements are being completed, according to report, for building this line, about 35 miles long, connecting the two cities named in North Carolina. E. A. Armstrong, of Camden, N. J., is President, and R. H. Cohn, of Norfolk, Secretary.

WASHINGTON-BALTIMORE ELECTRIC.—Surveys are being made for this proposed line connecting the cities of Baltimore, Washington and Annapolis. The principal office is in the Bond Bldg., Fourteenth street and New York avenue, Washington. James Christy has been elected Vice-President and will reside in Washington during the progress of the work. W. H. Lamprecht, of Cleveland, is President. (May 10, p. 324.)

WATERTOWN & CARTHAGE TRACTION (ELECTRIC).—This company has been incorporated in New York, with a capital stock of $200,000, to build a line 20 miles long from Watertown along Black River and through Felts Mills, Great Bend and Eggleston to Carthage. It is stated that building will be begun at once. The directors and principal stockholders are: Arthur S. Fairchild, John W. Horner, Jr., New York; Ernest S. Emanuel, Brooklyn; J. T. Hollister, Rutherford, N. J.; Clyde Notman, Short Hills, N. J.; John N. Carlisle, F. M. Hugo, L. L. Luther and Mason N. Swan, Watertown.

WAYCROSS AIR LINE.—The directors have decided to build from Fitzgerald, Ga., to Cordele, and surveys are being completed to let the contracts soon.

WEATHERFORD, MINERAL WELLS & NORTHWESTERN.—Locating surveys are reported in progress between Mineral Wells, Texas, and Graham, for the proposed extension from Mineral Wells northwest 63 miles via Graham to Jacksboro. (Construction Supplement, March 8, 1901.)

WILKINSBURG & EAST PITTSBURGH (ELECTRIC).—Booth & Flinn are reported to have taken a contract for a five-mile extension from East Pittsburgh, Pa., to Pitcairn, running south of the Pennsylvania.

WISCONSIN CENTRAL.—An officer writes that building is in progress by the lumber company on the proposed logging extension from Rib Lake, Wis., northeast into timber. There are about 50 men at work. (May 24, p. 358.)

YOUNGSTOWN-SHARON RAILWAY & LIGHT (ELECTRIC).—The contracts have been awarded for the rails for the proposed line between Sharon, Pa., and New Castle, 21 miles. (Construction Supplement, March 8, 1901.)

RAILROAD NEWS.

BALTIMORE & OHIO.—The Pennsylvania is understood to have largely increased its stock holdings in this company. On Jan. 1 last, according to the annual report, it owned $16,000,000 of the preferred stock, and the Northern Central owned $1,000,000. On May 29 L. F. Loree, Fourth Vice-President of the Pennsylvania Company, was elected President of the B. & O., and other Pennsylvania officers have since followed Mr. Loree into the B. & O. Co.

CENTRAL OF GEORGIA.—Kean, Van Cortlandt & Co., New York, are offering $1,650,000 Chattanooga Division 50-year gold bonds at 89 and accrued interest, subscription books to open June 10.

CINCINNATI, PORTSMOUTH & VIRGINIA.—The stockholders, on May 23, authorized the sale of the road to the Norfolk & Western. The merger will take effect on June 30, but meanwhile the road will be operated by the N. & W. as agent. (Jan. 25, p. 70.)

CLEVELAND & EASTERN (ELECTRIC).—Control of the Cleveland & Chagrin Falls Electric and the Chagrin Falls & Eastern Electric has been acquired by a syndicate representing H. A. Everett and E. W. Moore, of Cleveland, who also control the Cleveland & Eastern. It is proposed to reorganize the Cleveland & Eastern, to include the other two companies, comprising about 90 miles of track. The plan is to extend the system to Garrettsville, 15 miles, to be completed about Aug. 1, and also to ballast the track to Middlefield. (Chagrin Falls & Eastern Electric, May 3, p. 308.)

DALLAS, FORT WORTH & GULF.—This belt and terminal line around the city of Dallas, Texas, with a right of way for a projected line to Fort Worth, about 30 miles, is reported sold to the St. Louis Southwestern. (April 19, p. 276.)

DAYTON, LEBANON & CINCINNATI (ELECTRIC).—This property has been sold to the Dayton, Springfield & Urbana Electric, and it is proposed to build an extension to Lebanon Junction, to connect with the D., S. & U. at a point near Harshman's. This will give an electric line from Dayton to Lebanon, about 28 miles. The company also proposes to build a line from Highlands into Dayton, entering the city at the southern end, this extension to be used exclusively for freight.

DETROIT & PONTIAC (ELECTRIC).—This line, running out from Detroit, Mich., northwest to Pontiac, about 25 miles, has been sold to the Detroit United, which is acquiring control of other suburban lines about Detroit.

DETROIT, PLYMOUTH & NORTHVILLE (ELECTRIC).—The Boland-Flynn syndicate is reported to have bought this line from Northville, Mich., to Wayne, for part of a proposed Detroit and Chicago traction system which is projected from Detroit west to Battle Creek. (Railroad Construction column, May 31, p. 373.)

DETROIT SOUTHERN.—This company, incorporated to take over the property of the Detroit & Lima Northern and the Ohio Southern, will issue $4,000,000 first mortgage 4s, covering the former Ohio Southern; also $2,750,000 of similar securities to be a first lien on the D. & L. N., and a second lien on the O. S. It will also issue $6,000,000 4 per cent. preferred stock, and $10,000,000 common stock. The fixed charges of the new company will thus be $270,000 per annum, while the net earnings of the O. S. alone for the fiscal year ended June 30, 1900, were $306,123. (May 31, p. 374.)

GULF & INTERSTATE.—An officer of the St. Louis Southwestern writes that his company has not bought the Gulf & Interstate, as reported. (May 24, p. 358.)

HOT SPRINGS.—This line, extending from Hot Springs, Ark., to Malvern, 22 miles, has been acquired by the Choctaw, Oklahoma & Gulf. The road was recently sold to Colonel Joseph Dixon, of St. Louis. (March 15, p. 194.)

IOWA CENTRAL.—The stockholders, on July 31, will vote on a proposition to make a new mortgage to the Morton Trust Co., as trustee, to secure $25,000,000 of 4 per cent. 50-year gold bonds, to be used for refunding the existing $7,650,000 first mortgage bonds, and for future improvements and additions. Of the new bonds, $2,000,000 will be issued at once to retire $591,000 Keithsburg bridge bonds, $555,000 Iowa City & Western bonds and for equipment. (Oct. 5, 1900, p. 662.)

KANSAS CITY & NORTHERN CONNECTING.—The foreclosure sale of this property will take place on July 23, the upset price being $800,000. (July 13, 1900, p. 488.)

LITTLE MIAMI.—The Central Trust & Safe Deposit Co., of Cincinnati, is to be trustee under the new 3½ per cent. mortgage bonds for $3,000,000. These bonds are to be issued under the terms of the lease to the Pennsylvania to refund 7 per cents., and for improvements. (April 8, p. 104.)

METROPOLITAN WEST SIDE ELEVATED (CHICAGO).—Otis, Wilson & Co., of Chicago, have sold over $500,000 of the new $1,500,000 issue of extension mortgage 4 per cent. gold bonds, and are offering the rest at 98 and interest. The proceeds are to be used for the extensions under way in the west part of the city. (May 17, p. 342.)

MISSOURI, KANSAS & TEXAS.—The action brought by the heirs of Robert S. Stevens, of New York, to prevent the absorption of the Kansas City & Pacific have been discontinued and the matter is settled. (Aug. 17, 1900, p. 560.)

NORTHERN PACIFIC.—Official announcement is made that an understanding has been reached between the Northern Pacific and the Union Pacific interests under which the control of the N. P. will be left in the hands of J. P. Morgan. It is asserted that complete and permanent harmony will result under the plan.

According to press despatches from St. Paul, Minn., the Northern Pacific, on May 30, transferred its road in Manitoba to the Canadian Northern, under the terms of the bill recently passed. (May 24, p. 358.)

NORTHWESTERN ELEVATED (CHICAGO).—The directors have arranged with the directors of the Union Elevated for acquiring all the property rights and franchises of that company on a basis of $125 per share cash for the Union Elevated stock. The Northwestern Elevated will issue $25,000,000 of first refunding mortgage 4 per cent. convertible gold bonds to be secured by a mortgage to the Illinois Trust & Savings Bank, as trustee. The purchase of the stock and the new issue of bonds will be voted upon July 1. Of the new loan, $15,000,000 will be issued, of which $6,250,000 will be required to pay for the $5,000,000 Union Elevated stock, $5,250,000 for the redemption of the Northwestern Elevated first mortgage bonds at 105, and $750,000 for the retirement of $700,000 N. E. 5 per cent. certificates of indebtedness. Stockholders of the N. E. Co. will be granted the privilege of subscribing to the new bonds at 90, to the amount of their holdings of stock. The new bonds will be dated Sept. 1, 1901, payable in 10 years, and convertible at the option of the holder into preferred stock, and will be redeemable at the option of the company after Sept. 1, 1906, at 102½ and accrued interest. If called for redemption, the holder shall have the right to take preferred stock in lieu of cash.

OMAHA & ST. LOUIS.—The foreclosure sale is to take place at Council Bluffs, Iowa, July 17. The upset price is $1,250,000. (May 10, p. 324.)

OREGON & CALIFORNIA (SOUTHERN PACIFIC).—Fifty first mortgage 5 per cent. bonds of 1887 have been drawn for redemption from the proceeds of land at the Union Trust Co., New York, July 1, after which date interest will cease.

OTTAWA, NORTHERN & WESTERN.—Under the act of the last session of the Dominion Parliament the Ottawa & Gatineau has been changed to the above title. (Feb. 8, p. 104.)

PENNSYLVANIA COMPANY.—Sealed proposals will be received at the National City Bank, New York, up to noon June 29, for as many 4½ per cent. bonds as $578,430 will buy.

Sealed proposals will be received at the same time and place for the Cleveland & Marietta bonds to the extent of $12,500.

PHILADELPHIA COMPANY OF PITTSBURGH (ELECTRIC).—A plan has been approved for the amalgamation of this company with the Consolidated Traction, which provides for the organization of a new company with a capitalization of $40,000,000 collateral trust 5 per cent. bonds, $15,250,000 preferred stock 5 per cent. cumulative and $10,500,000 common stock.

PHILADELPHIA, WILMINGTON & BALTIMORE.—Plans are being perfected for consolidating this line and the Baltimore & Potomac, both controlled by the Pennsylvania.

ST. CLAIR, MADISON & ST. LOUIS BELT.—The stockholders, on May 25, authorized a mortgage to the St. Louis Trust Co., of St. Louis, as trustee, to secure the $800,000 4 per cent. gold bonds issuable under the reorganization plan. (April 12, p. 260.)

SALT LAKE & MERCUR.—This line, extending from Fairfield, Utah, to Mercur, 14 miles, is reported acquired by the Oregon Short Line, to be operated as a part of the Utah Division.

SOUTHERN INDIANA.—This company has made a new mortgage to the Equitable Trust Co., Chicago, as trustee, to secure $5,000,000 50-year 4 per cent. gold bonds, of which $1,500,000 is to be used for retiring a like amount of 5 per cent. bonds of 1898, and a portion for the line from Terre Haute to Westport, Ind. There is to remain $1,840,000 to be issued as required, of which $340,000 is to pay for equipment notes outstanding, $1,000,000 for additional equipments, and $500,000 for the general uses of the company at not over $125,000 per year.

UNION ELEVATED (CHICAGO).—More than two-thirds of the capital stock has accepted the proposition to sell the property and franchises to the Northwestern Elevated at 125. Payment for the property is to be made on or before Sept. 5. (See Northwestern Elevated above.)

WESTERN MARYLAND.—Mayor T. G. Haynes, of Baltimore, is reported as saying that two offers have been made to buy the city's interest in the Western Maryland, at a price to include the entire debt due the city, which, on Jan. 1 last, amounted to $8,527,972. Several other attempts have been made to buy the property. (Jan. 25, p. 70.)

WHEELING & LAKE ERIE.—According to a Pittsburgh despatch, Vice-President Joseph Ramsey, Jr., of the Wabash, has announced that this road has completed trackage arrangement into Cleveland, Ohio, with the Cleveland, Cincinnati, Chicago & St. Louis, from Wellington, Ohio, east 36.5 miles.